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ABSTRACT

The book reports on a descriptive study of communicative strategies used by 15 deaf preschoolers. Video recording with simultaneous direct observations were made once a month in a kindergarten for deaf and hearing children. Children were observed during periods from .5 to 2 years. Descriptions of communicative strategies are based on second-by-second transcriptions and analyses from video recordings of the children's use of nonverbal and verbal behaviors in interactions with others. Analysis revealed differences in the way the early sign language (ESL) and late sign language (LSL) users communicated. ESL Ss paid attention to partners in dialogues and joint activities while LSL Ss did not pay attention to the same extent. ESL Ss used signs accompanied by a sophisticated pattern of nonverbal behaviors while LSL Ss used signs in dialogues but also used many gross, sometimes exaggerated, nonverbal expressions as substitutes for formal signs. ESL Ss modified their way of communicating depending on the partner's possibilities while LSL Ss did not. Conclusions are offered regarding the importance of giving the deaf child an opportunity to acquire a language spontaneously via the visual-gestural channel. (CL)

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DEAF CHILDREN IN COMMUNICATION

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BY GUNILLA PREISLER

A STUDY OF COMMUNICATIVE STRATEGIES USED BY DEAF CHILDREN IN SOCIAL INTERACTIONS.

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DEAF CHILDREN IN COMMUNICATION

by Gunilla Preisler
Department of Psychology, University of Stockholm

The childhood shows the man,
as morning shows the day

John Milton in Paradise Regained, 1671

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SUMMARY

This is a descriptive study of communicative strategies used by fifteen deaf preschool children. Five of the children had early sign language experience (ESL), while ten had late sign language experience (LSL). Seven of the LSL children had been orally trained. Video recordings with simultaneous direct observations were made once a month during semesters in a kindergarten for deaf and hearing children. The children were observed during periods from one half to two years.

The descriptions of communicative strategies are based on second-by-second transcriptions and analyses from video recordings of the children's use of nonverbal behaviors (i.e. gaze, facial expressions, body movements, gestures etc.) and verbal behaviors (i.e. signs, articulation and speech) in interactions with other children.

The detailed transcriptions and analyses of the children's actions and reactions showed that there were differences in the way the ESL and the LSL children communicated. The ESL children paid attention to partners in dialogues and in joint activities. This attention pattern was not observed to the same extent for the LSL children. In dialogues the ESL children used signs accompanied by a sophisticated pattern of nonverbal behaviors. They discussed matters concerning the past and future events as well as the "here and now". The LSL children used signs in dialogues but also many gross, sometimes exaggerated nonverbal expressions as substitutes for formal signs. The content of the dialogues was only about the "here and now". The ESL children were observed to modify their way of communicating depending on the partner's possibilities. This was not observed for the LSL children subjected to oral/aural training.

The communicative strategies used by the ESL and the LSL children are discussed with reference to early interactions with the social environment. The importance of giving the deaf child the opportunity to acquire a language spontaneously via the visual-gestural channel is emphasized.

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I. INTRODUCTION

This study is about communication with special focus on those nonverbal expressions that are part of every communicative event. The subjects of my study are deaf preschool children.

My interest in communication dates back to the early 1970s, when I worked at the Audience and Program Research Department at the Swedish Broadcasting Corporation. Questions concerning how the audience - the tv viewer and the radio listener - understands and interprets the message of the media were the main topics of concern. After studying rules and strategies in one-way communication, my interest was successively directed toward two-way communication and rules and strategies used by humans in face-to-face interaction. Some of the questions posed involved the way people understand the "message" of a partner. What kind of behavior do we use and react to - either consciously and/or unconsciously - in interpersonal communication?

As I particularly worked with studies of children's reactions to the content in tv programs, it was natural to observe and to reflect upon how children communicate with the social environment.

Towards the middle of the 70s, production of tv programs for the deaf was started in Sweden. I became engaged in formative evaluations of tv programs for deaf preschool children. Observations of groups of deaf children in kindergartens were made when they were watching tv programs.

Most of the deaf children we met during these observations were very expressive. Among themselves and in the company of persons who knew sign language, they used not only signs but also gestures, mime and pantomime. When confronted with persons like myself who had a very limited vocabulary of signs, they modified their way of communicating.

They used every conceivable means of expressing themselves, making vivid use of gestures, facial expressions, pantomime, demonstrations and so forth, in a way that I had not noticed in hearing children. The question of how adults and children communicate in interpersonal encounters, now became more focused on the question of communicative strategies used by deaf children.

Studies of deaf children up to the mid 70s had mainly focused on personality development, social development and above all, on cognitive development. A review of these studies showed that many authors described the deaf as emotionally immature, authority-bound, limited in social sensibility and insight, impulsive, egocentric and aggressive, performing below hearing children in compatible ages on cognitive and language tests (see e.g. Pintner, Eisenson and Stanton, 1946; Oleron and Herren, 1961; Levine, 1963; Myklebust, 1964; Rainer and Altshuler, 1967; Herren and Colin, 1972).

The deaf children in the studies referred to had been exposed to oral/aural training methods and had not had access to sign language communication.

A review of the literature of deaf children's interactions with other deaf children, showed that this was a relatively unexplored area. Tervoort and Verbeck (1967) had studied communication patterns between deaf school children. They found that children who had been subjected to speech and auditory training, developed an esoteric system of communication, using gestures and signs among themselves.

In the American Annals of the Deaf and in the Volta Review, I found some studies which reported deaf children's interactions with other deaf children and also with hearing children. A closer look at these studies revealed that the subject of the research was not the interaction, i.e. the interplay of children's actions

and reactions, but rather the behavior used by each child separately. Moreover, in the descriptions of the children's behavior only a few broad categories were used, rendering a rather meager information of the actions and reactions displayed.

Detailed registrations and descriptions of deaf children communicating in social interactions are lacking. If we want to get a more well-founded picture and a better understanding of social and communicative skills of deaf children, detailed descriptions and analyses are needed of nonverbal and verbal behavior displayed by the children in different social settings.

In studies of children's reactions to the content in tv programs we had made video recordings of the children watching the programs. From these video recordings it was possible to make registrations of the children's actions and reactions to specific parts of the program they were watching. One of the results of this work was that we very soon discovered what an excellent aid video was in making observations of children's behavior and what possibilities there were to notice even very small movements or expressions in an individual child. The use of video when studying how deaf children communicate with other deaf children seemed necessary. Thus, I joined the rapidly growing corps using video as an essential research tool.

A fundamental methodological question is raised, however, when using video techniques in studies of communication. That is how to select from all behaviors that are possible to register, those that are important or significant or in other respects relevant to the study of child-child interactions.

During the 60s and the early 70s several studies had been published concerning man's use of nonverbal behavior, as visual behavior, facial expressions, body movements, body postures and gestures. Studies of children's use of nonverbal behavior had

also begun to appear. Many of these studies were either made by ethologists or influenced by ethological methodology. Descriptions of behavior units displayed by adults and children were presented in these studies. The early studies of nonverbal communication mainly focused on only one or on a very limited set of aspects of the communication process as e.g. the use of gaze, facial expressions or gestures. This was the case for studies of adults in interaction, for mother-infant and also child-child studies of interaction.

But individuals behave and act as whole persons and also react to others as whole persons. In order to give a more complete picture of the use of different nonverbal behavior involved in the encoding and the decoding process of interpersonal communication, it is necessary to study not only one or a limited set of behavior dimensions, but the complex system of behaviors.

The study to be presented here is a descriptive study of fifteen deaf children in interaction during different social settings at a kindergarten. The children, between three and seven years of age at the time when they were videorecorded the first time, belonged to groups of deaf children in a kindergarten for both deaf and hearing children during the time period 1978 and 1982. Analyses of communicative strategies used by the deaf children in interactions are based on detailed registrations and descriptions of the children's display of different nonverbal behavior, such as gaze, facial expressions, gestures, body movements and body postures but also their verbal behaviors such as signs, finger spelling, articulation and speech.

Three problem areas were initially of concern. The first matter of concern was to identify units of behavior that could be objectively and systematically transcribed. The next question was to find appropriate methods for analyzing the transcriptions of the children's actions and reactions in relation to the partner's. A method of analysis that could take into account

communication as a mutual process and requiring time was needed. The third methodological concern that had to be solved was how to recreate the rich flow of information from moving pictures to a reader - how to describe what and how the children did and acted in the observed interactions.

I.1 Definitions of the terms interaction and communication

Interaction occurs when people come together. Interaction can occur without having the same meaning for each interactant (Bullowa, 1979). Communication is recognized to take place in interactional contexts.

There is some confusion in the literature about the definition of communication. In every day use the word can have somewhat different connotations. Communication can denote the imparting of information and it can denote the act of sharing participation. In the first instance only one person need to be active. In the second some kind of mutuality is involved, which implies some kind of activity by at least two persons. The confusion of definitions appears to originate - at least partly - from these two different connotations.

In the large field of research about communication, there seems to be as many definitions of the concept as there are studies. However, intention, meaning, reciprocity and mutuality are included in most definitions. But as Barnlund (1968) states:

> "When one attempts to discover precisely what is meant by communication, one finds it surrounded by vagueness and ambiguity" (p. 4).

This statement, although formulated fifteen years ago, is still valid today.

The traditional model of the communication process, used in behavioral sciences has been borrowed from technical engineering and information theory (Shannon and Weaver, 1949). The communication pattern was defined in terms of a message that passes from a sender to a receiver through a channel. The definitions originally included structural-linear models to describe the flow of communication from sender to receiver. Later, circular models were proposed which incorporate the notion of "feedback" to modify the message transmission (Wiener, 1961).

Wiener, Devoe, Rubinow and Geller (1972) include in their definition of communication three elements

a) a socially shared signal system - a code
b) an encoder who makes something public via that code
c) a decoder who responds systematically to that code.

Their definition is close to the definitions used in cybernetics. What they define as communication in interpersonal encounters is restricted to the use of a code, most often a verbal code.

In psychoanalytic literature the term communication is used in a much broader sense. Psychoanalytic definitions of communication are similar to the term communication as used by Watzlawick and Beavin (1967):

"...in the presence of another all behavior is communicative" (p. 4).

According to their definition communication is almost synonymous to behavior in a social context. All interaction is included in their term communication and is analyzed in terms of consequences and effects. Watzlawick and Beavin do not restrict their definition of communication to those cases of intentional and successful interchange, where there is mutual understanding, but includes unsuccessful and distorted communication as well.

Ryan (1974), discussing Watzlavick's and Beavin's definition, states that their definition confuses information with communication, but concludes that the importance of their analysis lies in an emphazis given to the pragmatic as opposed to the syntactic or semantic basis of communication. Any analysis of human communication must include a description of the structure of intersubjectivity between participants in a dialogue (Ryan, 1974, p. 211).

The anthropologist E. Hall (1976) used an even broader definition of communication than Watzlawick and Beavin. Hall equated communication and culture:

> "What is characteristically man... is his cultures, the total communication framework; words, actions, postures, gestures, tones of voice, facial expressions, the way he handles time, space and materials, and the way he works, plays, makes love, and defends himself. All these things and more are complete communication systems with meanings that can be read correctly only if one is familiar with the behavior in its historical, social and cultural context" (p. 37).

Studies of infant-mother interaction have shed light upon the difficulty which exists in defining communication. The infant is capable of communicating and the caregiver can communicate with the infant, at least there is some intersubjectivity, some shared meaning between the two. But as Bullowa raises the question:

> "...how can we tell, we who are so dependent on words, that an infant who cannot say what he means, shares meaning with another person?" (1979, p. 4).

What is intentional and conscious communication is not only a question for the researcher of infant behavior, however. Bruner (1978) points at the same difficulty concerning adults as well:

> "Intent in communication is difficult to deal with for a variety of reasons, not the least demanding of which is the morass into which it leads when one tries to establish whether something was really or consciously intended... to obviate such difficulties it has been costumary to speak of the functions that communication or language serve and to determinate how they do so" (p. 24).

Microanalyses of adults in conversations, later followed by microanalyses of infant-mother interactions, have shown how humans in interaction are sharing rhythm (Condon and Ogston, 1967; Kendon, 1972; Condon and Sander, 1974; Bullowa, 1975; Tronick, Als and Brazelton, 1980). These results indicate that a traditional sender - receiver model is not sufficient in explaining interpersonal communication. Rather, each participant in the communication process must be considered as sender and receiver at the same time.

Communication is much more than using a code and responding to that code. It involves notions of mutuality, reciprocity and intersubjectivity as well as intention and meaning. One has to both speak (sign) or act and listen/watch one's partner while communicating. In the present study of social interaction between deaf children, the term communication will be used when there is considered to be mutuality, reciprocity, intersubjectivity, and also intention and sharing of meanings between the children.

I.2 The importance of synchrony and sharing rhythm in social interaction

In the beginning of the 60s, William Condon and his collaborators began to study human behavior and communication at a micro-level, using sound film and frame-by-frame analysis.
He found that:

> "...one of the very basic characteristics of normal individual and interactional behavior was temporal synchrony. Such integration (or organization) is manifested in the synchronized timing or changing together of the aspects of behavior with each other, including both speech and body motion" (1979, p. 131).

Together with Ogston (Condon and Ogston, 1967) he found that when two persons are talking, the speaker moves several parts of the body in synchrony with the articulatory pattern of his speech, so called "self synchrony". But not only the speaker moves in

synchrony with his own speech or movements, also the listener moves in precise synchrony with the articulatory pattern of the speaker's voice (Condon, 1979). Condon describes it as a "remarkable sort of dance" (p. 131).

Sound films of neonates have revealed that this interactional synchrony or as Condon (1979) also calls it, "entrainment", starts very early in human life. Sound films of sixteen neonates, one to four days of age, revealed that the infants showed marked synchronization of body movements with both taperecorded and live human voices (Condon and Sander, 1974). It has even been observed in a sound film of an infant as early as twenty minutes after birth, and may exist prematurely (Condon, 1979).

Dodd (1979) presented twelve ten to sixteen weeks old infants with nursery rhyhmes spoken with speech sounds and lip movements in-synchrony and out-of-synchrony. Observations of the infant's attention to the two types of stimuli showed that the infants attended significantly less to the out-of-synchrony than the in-synchrony presentation.

Dodd interprets the results as an indication that young infants are aware of the congruence - the synchrony - between lip movements and speech sounds. Gibson (1966) and Bower (1974) have suggested that neonates have an innate coordination of the senses; a notion which is supported by Dodd's result.

Studies of autistic children have revealed that there were delayed responses in their body movements in relation to sounds (Condon, 1979). Also in schizophrenic patients this synchrony of movements has been found to be distorted (Condon and Ogston, 1967).

Synchronization of body movements in relation to one's own speech sounds and body movements as well as those of one's partner, can be considered an important, if not necessary, requirement of the communication process.

Most research on synchronization has been made in relation to the spoken word. Meastas y Moores (1980) however, studied deaf mothers using sign language in interaction with their infants in their first, second or third month. The children were as yet too young to be diagnosed as hearing or deaf. (10 - 12 % of the children of one or both parents being deaf, are themselves deaf. (Freeman, Carbin and Boese, 1981)). Maestas y Moores found, in one child of twenty-four days of age, synchronization of finger movements in relation to the mother's sign language.

The synchronization process probably starts very early in life and embraces all kinds of rhythmical phenomena, not only speech and sound.

Byers, an anthropologist, has analyzed data from films of different cultural groups. His analysis indicates that there is a rhythm sharing phenomenon in different cultural groups (1979). He interprets this result as evidence of an underlying biological rhythm which traces, guides and integrates the behavioral expression of brain programs. Byers defines human communication as:

> "...the process or processes which implement, maintain, or change the state of relatedness between or among people. "He adds: "And since the "state of relatedness" can be derived from observations of rhythm sharing... I find it useful to say that individuals are "in communication" when this shared rhythmic relationship ... is occurring" (1979, p. 406).

Bullowa (1979) also uses the term "in communication" and writes:

> "For an infant to enter into the sharing of meaning he has to be in communication, which may be another way of saying sharing rhythm" (p. 15).

II. THE IMPORTANCE OF INTERACTION IN INFANT DEVELOPMENT

II.1 The child develops in interaction with the physical and social environment

> "The human being is immersed right from birth in a social environment which affects him just as much as his physical environment ... Just as the physical environment is not imposed on developing intelligence all at once or as a single entity, but in such a way that acquisitions can be followed step by step as a function of experience... so the social environment gives rise to interactions... that differ greatly from one another and succeed one another according to definite laws" (Piaget, 1947, p. 156, 157).

This interaction is, according to Piaget (1952) not to be interpreted as a stimulus-response model in the sense that the child learns fundamental concepts and operations primarily through an exchange with the environment and that future response tendencies are altered and habits are built up, depending on the outcome of these exchanges. Piaget's opinion is that the environment is not something that happens to the child; not a stimulus that elecits a response. Rather, the child seeks out those features of the environment to which he can respond meaningfully, both by assimilating them to already existing structures and by accomodating those structures to make continued assimilation possible.

The extensive developmental studies by Piaget, based on observations of children, have shown that what the child brings to the world, makes growth possible, but the child himself must accomplish it through his own activities (Gruber and Vonèche, 1977).

According to Piaget (1952) knowledge originates in activity, originally as overt actions in the infant, shown in the physical manipulation of objects. Symbolic activity is a function which in some sense emerges as a result of the child's activities. At the end of the sensorimotor period, there appears a pattern that is fundamental to the development of later behavior.

This pattern evinces itself in the ability to represent something (a signified something; an object, an event, a conceptual schema, etc) by means of a signifier which is differentiated and which serves a representative purpose. Language, mental image, and symbolic gesture are important common areas showing the development of this function (Piaget and Inhelder, 1969).

II.1.1 The infant - an active partner in interaction

Piaget made us aware of the fact that the infant is not merely a recipient of impressions and information. The infant is an active explorer, acquiring knowledge in the interactions - actions - with the environment. Piaget did not study the infants' social interactions. Moreover, not having access to the technical equipment of today, he did not have the means for the micro-analyses of behavior which have now revealed the communicative capacities of infants.

Ainsworth, Bell and Stayton (1974) hold the position that the infant is, from the beginning, genetically biased towards interaction with other people. The sensory equipment of the infant is responsive to stimuli most likely to stem from people and many of their behavioral systems are most readily activated by such stimuli.

Brazelton (1979), having made numerous observations of neonatals, concludes that the infant seems to be "programmed" for interaction with his social environment.

Through detailed observations from film and video recordings of infants in interaction with their mothers, Trevarthen accepts the idea that

> "...human beings are equipped at birth with a mechanism of personality which is sensitive to persons and expresses itself as a person does. Obviously such a mechanism must be formulated largely within the brain before birth without benefit of imitation and training..." (1979, p. 321).

II.1.2 Mothers react to children's actions as if they were intentional

In discussing what communication is, it was stated that intention and meaning, as well as mutuality, reciprocity and intersubjectivity are parts of the concept of what is meant by communication. Measurement is difficult when studying reciprocity, intention and meaning, etc, in the case of the neonatal infant or the very young child. Possibly the best measures are obtained via the mother who reacts particularly to the child's movements and expressions as if they were intentional and meaningful. Newson (1979) states that adults who react sensitively towards a human infant

> "...time their interventions or gestures in ways which are reciprocally patterned. They make the assumption that the infant is attempting some form of meaningful dialogue, and out of this assumption the communication of shared meanings gradually begins to take place" (p. 208).

Schaffer (1977) and Shotter (1978) have suggested that it is the skill of the mother which mainly accounts for the alternating form of the "dialogue" which can be observed between mother and infant. But they also mean that infants must be biologically primed in specific respects for it to be possible for mothers to select points of action in the situation in order to stimulate this dialogue.

Most of the things a human infant learns are learnt in the context of a dynamic social process of interaction. Shotter formulates this learning process in the following way (1978):

"It is proposed here that the developmental process ... is embedded in the communications which take place between the infant and those others in his society who are already (relatively) autonomous individuals. And the thesis that I want to defend here is one drawn, primarily, from Vygotsky (1962, Chapter 6): simply, that the activity which issues from one spontaneously, in the course of acting as one's circumstances require, may be transformed into deliberate action if one can learn from others some reasons for it; that is, broadly, if one can learn from them, by the way in which they "reply" to what one does, to what in the social world one's actions may lead, so that later, one may act in the knowledge of the social consequences of one's action" (p. 44).

II.2 Early patterns of interaction between infant and caregiver

In the last few years psychologists, pediatricians, child language researchers, ethologists, social anthropologists and others have begun to study early patterns of interaction between infant and caregiver, by means of detailed observations and analyses from video recordings and films.

The results from these studies have shown how even the neonatal infant is actively interacting with the caregiver by means of gaze, facial expressions - particularly smiles - gestures, touch and vocalizations from the infant and gaze, facial expressions, gestures, touch, vocalizations and speech from the caregiver (e.g., Lewis and Rosenblum, 1974; Brazelton, Koslowski and Main, 1974; Condon and Sander, 1974; Schaffer, 1974, 1977; Trevarthen, 1974, 1977; Stern, 1974; Bullowa, 1975, 1979; Bakeman and Brown, 1977; Bell and Harper, 1977; Newson, 1978; Lock, 1978; Sylvester-Bradley and Trevarthen, 1978; Waterson and Snow, 1978; Newson and Newson, 1979; Condon, 1979; Kaye and Fogel, 1980; Tronick, Als and Brazelton, 1980).

Trevarthen (1979) made video recordings of interaction between infants and mothers in order to study the intersubjective processes. The term "intersubjectivity" is used by Trevarthen in the same sense as Habermas (1970, 1972) did when he considered the origins of language from a psychoanalytic viewpoint.

Intersubjectivity specifies the linking of subjects who are active in transmitting their understanding to each other.

> "The relating is "interpersonal" but we need to penetrate the psychological process by which conscious intending subjects relate their mental and emotional processes together" (Trevarthen, 1979, p. 347).

Mothers of thirty-four infants made visits to the laboratory from the time their babies were two to three weeks old. Trevarthen found that already by the fourth or fifth week of age, there was a well developed pattern of interaction between the infant and the mother. The films showed how the mothers quickly became attentive to and dependent on what the infants did as soon as the infants joined in communication.

The mothers reacted as agents who are subordinate to acts of their babies. Observations of the mother's behavior showed how the mothers imitated or "mirrored" the behavior of the infants. The mothers imitated what the infants did, or imitated parts of the babies' actions.

Based on such results Trevarthen concluded that there is a complex form of mutual understanding already by this early age. The mother adapts to the infant and there is innovation of meaning by the infant as well as by the mother.

Brazelton, Koslowski and Main (1974) analyzed the behavior of five "normal" mother-infant pairs. The infants were between two and twenty weeks of age. They found that the most important rule for maintaining an interaction seemed to be that the mothers developed a sensitivity to her infant's capacity for attention and the infant's need for withdrawal after a period of attention to her.

There were short cycles of attention and nonattention in the more prolonged interaction. Looking away - nonattention - was explained as reflecting the need of each infant to maintain some

control over the amount of stimulation he can take in via the visual mode.

Studies of children four to eleven months of age in mother-child interaction have shown that the child and the mother are engaged in

> "..."conversation-like" exchanges. These typically take the form of well-worn rituals of interaction to which the baby clearly makes a real and positive contribution" (Newson, 1978, p. 33).

By the age of ten to eleven months the child has developed a highly sophisticated communicative competence. By this age the child knows how to show dissatisfaction. The child can take part in play and even masters the art of joking and cheating (Newson, 1978).

II.3 The importance of vision and mutual gaze

Goren, Sarty and Wu (1975) showed in an experiment that as early as nine minutes of age human infants are more attracted to the eyes than to any other visual stimulus.

Vision is already well developed at birth. The myelogenetic cycle of the visual pathway is developed in one short perinatal phase which ends around the fourth or fifth month of life (Lecours, 1975).

The myelogenetic cycle of the acoustic pathway occurs in two stages, the first is short and occurs primarily prenatally while the second is not completed until somewhere before the end of the fourth or beginning of the fifth year (Lecours, 1975).

> "The critical period for hearing seems to be much longer than that for vision... - perhaps as long as five years (Bower, 1977, p. 85).

Bower (1977) discusses the importance of vision during the first months of life and his observations are in agreement with the results of Lecours.

> "Loss of vision during the first six months of life has permanent effects on the ability to use vision. The loss of six months' worth of vision has progressively less effect the older the child is when temporary blinding occurs" (p. 84).

By the second or third month infants show improved visual focus and their eye movements indicate a change in the direction of their visual attention (Trevarthen, 1979). A two month old infant can show preference by looking at things of interest and can also avoid visual contact by looking away. Systematic eye movements to or away from the hands and the face of a partner, especially to eyes or mouth are important signals in person-to-person interaction (Caron, Caron, Caldwell and Weiss, 1973; Maurer and Salapatek, 1976).

The looking behavior of neonates when viewed in slow motion action replay is very delicately coordinated with certain hand and arm movements and even with facial and mouthing movements in the infant (Newson, 1979).

During the first months of age, the child is looking primarily towards the face of the caregiver (Kaye and Fogel, 1980). During this period, the caregiver is mostly talking about the child when talking to it.

After a period of time, the child starts to alter the direction of his gaze towards things or movements in the environment, so called deictic -pointing- gazes (Collis, 1979). This change in direction of the eyes functions as a trigger for the caregiver to start naming the things or the attributes of the things towards which the child seems to be looking.

Detailed observations of visual behavior in the mother-child dyad, indicate that it is the child who initiates this new phase in interaction, not the mother (Trevarthen, 1979).

Deictic gazes have the potential of directing the attention of the caregiver to objects and events in the environment. Joint attention and joint action are important prerequisites for language development in the child (Bruner, 1975).

The mothers need to call upon a variety of dyadic techniques in relating to their infants. The early interaction sequences generally begin with the infant's own spontaneous behavior, the mother then chimes in to support, repeat, comment and elaborate his responses. She holds herself ready to let the infant resume as soon as he wishes, and in this way she makes it possible for a dialogue-like exchange to be set in motion. A sort of turn-taking where each participant has his turn, occurs. Turn-taking by visual and vocal means has been shown very early in mother-infant dyads (Jaffe, Stern and Peery, 1973; Robson, 1967; Kaye, 1977).

The child stimulates the caregiver to communicate with him: this is especially prevalent when the child is looking at the mother. Many congenitally blind children do not elicit these reactions in the caregiver, to the same extent as the sighted child, which can have the consequence that mothers to blind infants engage in less interaction and less communication (Fraiberg, 1977; Urwin, 1978; Jonson, 1979).

Fraiberg (1977) has studied blind infants in interaction with their mothers. She describes the mothers' difficulties to establish a communication with their blind infants. From video recordings and direct observations she observed how the mothers tried to initiate contact and communicate with their infants by using the voice. But these attention calls were according to the author, not possible to register from the facial expressions of the child. Fraiberg writes that instead of an expected smile or other facial expressions, the children's faces became blank and motionless. The mothers interpreted this as a sign of rejection. A similar view of mother-blind infant interactions is reported by Burlingham (1965) and Windahl (1981).

II.4 The use of facial expressions

Facial expressions in newborns and young infants closely resemble those of adults for the emotions of pleasure, displeasure, fear, surprise, confusion and interest; these expressions can be distinguished from photographs and video recordings. These movements are automatically perceived as "emotional" by adults (Darwin, 1872; Ekman, 1973; Charlesworth and Kreutzer, 1973; Leboyer, 1974; Oster and Ekman, 1978).

One of the first obvious social behaviors in which the infant engages, is smiling. The full-scale smile, i.e., the smile that gets up as far as the eyes and the forehead emerges at the age of about six weeks, or to be exact, at the conceptual age of forty-five to forty-six weeks, regardless of the chronological age (Dittrichova, 1969).

But smiles can be observed from the first day of life. However, these very early smiles do not usually reach the eyes, but involve only the mouth and the cheeks. Even premature infants smile and recognizable smiles may occur within minutes after birth (Leboyer, 1974). These very early smiles will appear spontaneously, i.e., they will appear while the baby is asleep or not attending to any stimuli from the surrounding world. In the third week the baby will show real smiles; these do not last as long as the full-scale smile, or as Bower (1977) calls it "the true social smile" but are recognizable real smiles.

By the time the baby is six weeks old, full-scale smiles at human faces appear (Bower, 1977). At this age a human face appears to be the most effective of all possible stimuli for eliciting a smile from a baby, far outranking the voice.

These results are used by Bower (1977) to show that an earlier hypothesis that early smiling is a learned response, resulting from the association of human faces, is not sufficient in explaining the functions of these early smiles. Piaget (1952, 1962) records expressions of "pleasure in mastery" and "serious intent" with respect to cognitive tasks.

Hunt and Uzgiris (1964) gave identical mobiles to two groups of infants in their cribs. The mobile was set into motion for one of the group of infants, but not for the other. Instead, in this group the mobile was placed in a position that made it possible for the infants to set them into motion themselves. There was no such possibility in the first group. Infants who could set the mobile into motion showed clear smiling and cooing behavior while they were controlling the mobiles, this was not reported to any significant extent in the other group.

As mentioned earlier, by the age of six weeks the strongest stimulus to elicit a smile in the sighted infant is the human face. In the blind infant there is no such strong stimulus for smiles. From video recordings of mothers with their blind infants, Fraiberg (1971) found that the most reliable stimulus for evoking a smile or laughter in the blind infant was gross tactile or kinesthetic stimulation, although she found smiling behavior in a blind baby, four weeks old, as a response to the voices of the parents. Bower (1977) and Emde and Koenig (1969) found that a well known voice elicits smiles in the sighted child by this age, although with no regularity.

Bower (1977) worked with a blind baby, who at eight weeks of age did not smile at all. But when this baby was given an auditory mobile and contingent control over the mobile - he could by kicking his legs produce a change of sound - he began to smile and coo.

Watson (1973) was interested in the learning abilities of infants. He studied the infant's detection of a contingent relationship between a particular behavior and an event in the external world. Watson noted that in the process of detecting a contingency, the baby smiles. He interpreted these smiles to be caused by the discovery of the contingency and to manifest the pleasure that the infant feels at having successfully detected what to do to make a particular event happen.

Papousek (1969), conducting similar studies as those later to be undertaken by Watson, discovered that the actual characteristics of the event the baby was producing were quite unimportant. What was important was that there was a relationship between a given behavior and a given event in the external world.

II.5 The use of hand movements and gestures

The infant is born with a grasping reflex. This reflex gradually disappears by the age of two to three months of age, and is replaced by a more conscious grasping movement.

The infant can use his arms and hands, although he is normally given no opportunity to do so. Bower (1972) has shown how a newborn supported in such a way that his trunk is steady and his hands and arms as well as head are free to move, can be observed to be engaged in reaching movements. The neonatal infant can reach out and hit things and can occasionally grasp them. Bower comments these results in the following way:

> "...many new mothers had told me that their infants could reach out and touch things. My response was polite skepticism. I was so convinced that the textbooks were right and that reaching began at about five months - not five days - that I simply paid no attention to such reports. I was finally convinced that they had some substance when I saw my own nephew display this behavior at three weeks of age; and again when a child of a collegue ... also did so at the age of only one week" (1977, p. 27).

Bower noted that many studies have shown that neonates reach for objects quite a lot, although with a poor hit rate. When the child is about four weeks old, there seems to be a decline in reaching behavior until the infant is about five months old when there again seems to be reaching movements to a greater extent, but this time with a vastly improved hit rate (1974). Bower's own experiment showed that infants exposed to an experimental situation with opportunities to reach for objects, showed no decline in reaching movements. The decline seems rather to result from lack of use of the behavior, rather than from inevitable neural growth processes.

Trevarthen (1974) observed the movements of infants when they were socially stimulated compared to those when looking at an interestingly moving object. While socially stimulated, infants were observed to smile, the hands moved horizontally in a lateral plane from side to side, as though they were waving.

Their mouths were observed to exhale breath as in speech. While optically stimulated by an object, on the other hand, the infants showed different facial expressions and hand movements which Trevarthen labelled "prereaching". The face of the infants looked attentive, the mouth taking an A shape that gave at least the observers the impressions of concentration. The hands moved vertically up at the apex of the movement, then descended closing in a pincers grasp at the base of the movement. These movements were most clearly observable at the age of two months, but occur neonatally, according to Trevarthen.

As the movements of the hands become more differentiated and mature, other patterns of movements become more mature and differentiated as well. From the infant's ability to use his hands and arms to support himself comes the ability to raise himself, to stand on his feet and arms, to creep and to sit. Vision is very important during these first stages of the development of an active use of hands in reaching, searching and manipulating.

Papoušek and Papoušek (1977) observed how mothers responded to changes in their infants' behavioral state from a very early age; in fact during the first postnatal week. Analysis from film and video recordings showed that the position and activity of the infant's hands alone, could give the mother sufficient information. Papoušek and Papoušek describe the infant's transition from lively waking activities to sleep. The hands are first raised and partly stretched towards the mother, the fingers moving and the palms open. Then the finger movements decrease and the hands are held stationary for increasing periods of time, until they start dropping lower and finally rest motionless at the sides of the infant. Fists held closed for more than several seconds indicated fatigue and distress caused by unusual or discomforting circumstances.

Papoušek and Papoušek discussed with the participating mothers about the researchers observations of the film and video recordings.

The mothers claimed that they were totally unaware of any cues although film recordings showed how they, for example, were touching the closed fists, trying to open them slightly and to find out by verbal questions the reason for the infants discomfort or distress.

At this early age - a couple of weeks - the infant's hand movements can hardly be defined as gestures, as communicative movements of the hands. But the caregiver seems, unconsciously or consciously, to respond to these movements <u>as if</u> they were communicative. Lock (1978) describes how this transition from action to gesture can occur. He takes as an example the way we usually carry the infant. We push our hands under the armpits of the infant. In the early occurrences of this activity the child's arms only get raised by the physical consequences of the mother pushing her hands under his armpits. The young infant shows no active adjustment to this behavior of the mother. But fairly

quickly the infant becomes accustomed to being picked up and begins to recognize his mother's activity towards him. This is evidenced by the fact that the baby now shows anticipation of her reactions; he raises his arms by himself and does not rely passively on the mother's efforts. When a baby raises his arms towards a caregiver this will, for most caregivers, be interpreted as an intentional action to be lifted up.

Nielsen (1979), who works with blind children, emphasizes the importance of guiding the blind infant in using his hands, as the blind infant does not reach for objects spontaneously.

When Fraiberg (1979) examined blind infant-mother reciprocity she began to look at the mother's face and the infant's hands. "We became hand watchers as a staff" writes Fraiberg (1979, p. 161). In the movements of the hands of the infants it was possible to find the response to the mother's attention calls. The researchers, as well as the mothers, began to read intentionality into the barely visible motor signs of the hand of the blind infants.

The referential function of communication can be performed gesturally by pointing. For a successful communication, the referer's attention to the object is demonstrated by the manual gesture and, either before or while pointing, he will also gain the attention of his communication partner to himself in order for the partner to attend to the gesture. Each partner's attention is therefore given both to the other and to the object of reference.

The "normal" child can integrate visual and manual behaviors and perform both simultaneously in the pointing gesture around the age of one year (see p. 32).

According to Vygotsky (1962) the pointing gesture is, in the early developmental phase, an unsuccessful grasping movement. The child then needs the experience of the caregiver responding helpfully. Vygotsky further stated that referring behavior occurs because the child has learnt to associate his mother with the experience of wanting and failing and then receiving.

Bower (1972), on the other hand, seems to hold the opposite position; that the infant is in some unlearned way aware of the presence of the adult, and that presumably because of neurological programming this awareness results in gesture-like hand movements and in vocalizations that sound like the emotion of wanting.

Gray (1978) suggests contra Bower that it is not simply a matter of an inborn neurological programming of the child being aware of the adult and contra Vygotsky that it is not simply a matter of the mother responding to the child's behavior towards the object. Rather in referential communication both mother and child change in relationship to each other, as the child develops.

The age at which an infant understands that a pointing gesture is a social signal designed to attract one's attention to a specific object, is the subject of some uncertainty. Mallitskaya (translated in Slobin, 1966) noted that by the age of about nine months a normal baby can differentiate objects and understand the gesture of pointing. Other researchers such as Ling and Ling (1974) have found that it is not until the end of the first year that mothers use the pointing gesture with their infants and not until a few months later that the infants themselves use this gesture voluntarily.

Murphy and Messer (1977) observed twenty-four mothers and infants in a study about pointing behaviors. The infants were between nine and twelve months old. The mothers were asked to draw the infants' attention to toys placed in the observation room. The observations were videorecorded and data analyses involved frame-by-frame inspection of the video recordings.

The results showed that infants nine months of age are beginning to respond to pointing gestures. Their gaze was directed by points in the "away" direction of the mothers' hands in the pointing gesture. The fourteen month olds were successful in adapting their vision to follow the mothers' pointings. More than half of the infants in the fourteen month group showed pointing gestures themselves.

It was further found that the mothers' pointings and lookings were remarkably well synchronized. The onset of pointing was accompanied by the beginning of a glance at the toy. A glance at the object at which the mothers were pointing appeared to be an integral part of pointing behavior. The infants' looking behavior while pointing and reaching, was similar to that of the mothers while they were pointing.

Leung and Rheingold (1981) studied forty-eight infants between ten and sixteen months of age with their mothers in an experimental setting. Their aim was to discover at which age infants call interesting objects to the attention of others by pointing; as well as to relate their ability to follow another person's pointing to their own use of the gesture and to compare the use of pointing and reaching.

Leung's and Rheingold's results showed that pointing is a well established behavior by the time children are about one year of age. At this age the gesture resembles that exhibited by adults in both appearance and function. The infants have learnt not only to look where others point but also that others will look where they point. Leung and Rheingold propose on the basis of their results, that infants at a very early age have acquired the ability not only to take the visual perspective of others, but also to share with them their own perspective of the world (p. 220).

Leung and Rheingold found pointing gestures at an earlier age than Murphy and Messer (1977). The difference in age at which the pointing gestures were registered - two months - could be due to the setting in which the gestures were studied. Leung and

Rheingold used an experimental setting with stimulus objects provided to increase the likelihood of an infant's pointing. Murphy and Messer studied pointing in an observational setting with no particular stimulus objects.

Murphy and Messer made an attempt to observe mothers of younger infants, but this part of the study was abandoned because the mothers pointed in a completely different way when obliged to attract the attention of their infants at an earlier age than nine months. The mothers were found to spend a lot of time placing a finger in front of the infants' eyes, clicking their fingers and then slowly drawing the hand towards the object.

A question that is raised by the Murphy and Messer study is why the mothers behaved in this manner toward their infants? This question, not posed in the study, could find an answer from a developmental perspective. What happens in the child at the age of around nine months? Trevarthen and Hubley (1978) have studied infants from birth up to the age of one year by means of video recordings and detailed analyses of mother-infant interactions. By using a longitudinal approach they could study variations and fluctuations in behaviors as the infant grew older.

According to observations made by Trevarthen and Hubley (1978), the infant at around the age of nine months accepts persons in a new way. The most important feature of this new way is that the infant now is systematically combining interests in the physical world and his acts of communication addressed to persons.

> "A deliberately sought sharing of experiences about events and things is achieved for the first time. Before this, objects are perceived and used, and persons are communicated with - but these two kinds of intention are expressed separately. Infants under 9 months share themselves with others, but not their knowledge or intentions about things" (1978, p. 184).

Trevarthen and Hubley (1978) suggest that incomplete studies of a given function missing early manifestations can give a false indication of how this function develops.

II.6 Summary

In this chapter, early patterns of interaction between infant and caregiver have been described. Michroanalytic techniques have been used to study infants' and mothers' behaviors in most of the studies referred to.

Detailed descriptions from video or film have made it possible to observe the concurrence of different behaviors in infants and also the infants behaviors in relation to the caregivers' actions and reactions. The results of these detailed registrations of mother-infant interaction have revealed amazing communicative abilities of infants. Even the neonatal infant has shown to be actively interacting with the caregiver by means of mutual gaze, facial expressions, gestures, touch and vocalizations. The studies of mother-infant interaction have further revealed the importance of visual signals, particularily eye contact, in the development of prelinguistic communication.

As the infant grows older, the system of communicative behaviors between caregiver and infant develops and gets more sophisticated. Both the caregiver and the infant change their behaviors towards each other, and change in relationship to each other, as the infant develops.

The research of mother-infant interactions has been both experimental and based on observations in more natural settings. In some studies reported, the infants and their mothers have been observed from the time the infant has been a couple of weeks old, until the age of around one year. In other studies, registrations have been made of infants' and mothers' behaviors at a specific age of the infant.

The importance of a longitudinal research approach in studies of infant development is emphasized as registrations of infant behavior on single occasions only, can give rise to false interpretations of the development of a certain behavior.

III. THE IMPORTANCE OF SOCIAL INTERACTION IN LANGUAGE DEVELOPMENT

Studies of mother-infant interaction have shown that it is in the early patterns of communication that language gradually develops in the child.

III.1 Prelinguistic communication

By studying child language development from a very early age, it has been found that the child has knowledge of the semantic and pragmatic aspects of language and expresses whishes and thoughts by means of gestures, facial expressions, body movements and deictic gazes well before the age of one year, i.e., before he can formulate his first word or form his first sign (Dore, 1974; Goldin-Meadow and Feldman, 1975; Greenfield and Smith, 1976; Lock, 1978; Trevarthen and Hubley, 1978; Bullowa, 1979; Trevarthen, 1979).

In child language research and in psycholinguistics the earliest prelinguistic stages of language development have until recently been neglected. Diary studies of individual children have, up to 1960-1970, provided the most detailed and valuable information about the early stages of language development. In some of these studies (e.g., Stern and Stern, 1907; Lewis, 1936) attempts were made to trace the origins of early speech in the previous vocalizations of the infant. Characteristic of early child language studies was a considerable emphazis on the phonological aspect of early speech (e.g., Stern and Stern, 1907; Lewis, 1936; Leopold, 1939). In these studies attention was also paid to the functions of early utterances and to the related question of categorizing the utterances of the child. But the underlying problem concerning the criteria for interpreting the meaning of the utterances was never explored. The first study of child language development which takes meaning into account, was published by Bloom (1970). The meaning of the child's utterance was inferred from the con-

text in which it appeared, taking into account some nonverbal aspects as well as the interaction between the child and the caregiver.

In psychological research Piaget has pointed at the importance of nonverbal prerequisites for the emergence of language. (Vygotsky (1962) and Bruner (1968) have also made speculations on the topic.) Piaget views language as part of the general development of intelligence and describes language development within the general framework of the transition from sensorimotor to representational modes of thought. Piaget regards language as simply one facet of cognitive development, providing an economical means of representing reality. A prerequisite for language development is that there are cognitive structures which allow for representation of phenomena in the environment.

Linguists and psycholinguists emphasized the more unique nature of language and the complexities facing the developing child (Brown, 1973; Brown and Bellugi, 1964; Lenneberg, 1964; Cazden, 1968; McNeill, 1970; Smith and Miller, 1966). From a Piagetian perspective, psycholinguists have exaggerated the "achievement" of a child in acquiring language (Ryan, 1974).

Piaget traced the origin of representational thought and language development in prelinguistic interactions with the environment. Piaget states that the representational functions are developed in imitation and play.

Premack and Woodruff (1978) hold the position that the critical question whether a behavior can be defined as language or not, is if it is a representation of representations.

Early linguistic research about child language development has been criticized by, among others, Labov (1974) who states that linguistic research has neglected how language is used in different social settings. The primary function of language is to

communicate and its beginnings need to be understood in the context of interpersonal situations (Bruner, 1975; Schaffer, Collis and Parsons, 1977; Trevarthen, 1977, 1979, among others).

Bruner states that language is learnt as an instrument to regulate joint actions and joint attention. One of the fundamental functions of language is cooperation (Bruner, 1975).

III.2 A sociolinguistic perspective on child language development

Communication takes place in social interaction and is a mutual process where the interactants adapt to one another. Previously the child has been the only focus in child language research. But if we want to have a more complete picture of the process of child language development, the caregiver who is in interaction with the child, must also be included in the analysis.

Recently a number of researchers like Labov (1974), Halliday (1975), Bruner (1975), Schaffer (1977) and Bullowa (1979) have studied language development from a sociolinguistic point of view, where language is regarded as a social behavior. The early patterns of interaction between the infant and the caregiver are regarded as the foundation for language development in the child.

Interaction and joint action are important in the life of the developing child. Söderbergh (1979) gives an example of the importance of these social behaviors. She describes a Swedish child whose parents were graduate students. The child was taken care of by a young girl at home. The research team noted that the child had very good contact with the parents. The parents also seemed to be sensitive to the child's needs and desires. They listened to her attentively, and they talked in an adequate way to her. The young girl working in the house showed, however, very little sensitiveness to the child's needs and seemed very uninterested in her work.

At 2:4 years of age, the child used only nonverbal means of communication. During the following period she started to use single words; when she was 2:7 years she started to talk in two word phrases. The following month the family got a new au-pair girl for the child, this time from Poland. Contrary to what was expected, the child started to talk and her language development grew very rapidly. The Polish girl was very interested in her work with the child and the two were constantly engaged in a lot of common activities.

Activity gave reason for the two to talk about what they were doing. As the Polish girl did not have a good command of Swedish, she used all the words she knew, and the child used all the words and phrases she knew. This time the child needed language to communicate. With the other young girl she had no need for language, as they usually had nothing to talk about.

III.3 Modification of communication

As mentioned before, language development ought to be seen as a process of interaction between the child and the caregiver. The way the adult is talking and behaving is also important in the study of language and communicative development in children.

Studies of the way adults talk to children, have shown that they modify their speech when talking to children. This is called "baby talk" (see e.g., Snow and Ferguson, 1979). Baby talk is frequently used by adults in interaction with infants and children, and can be distinguished from normal speech by the use of shorter sentences, repetitions, higher overall pitch of voice, simple clauses, and few modifiers.

Berko-Gleason (1979) suggests that the children themselves help to shape the language behavior of those who speak to them by the kind of feedback they produce. This feedback is in the form of eye contact, nodding, blinking and smiling.

Baby talk is not only used by adults to children, but also by older children to younger. Schatz and Gelman (1973) reported that four year old children showed modestly syntactic differences depending on the age of the addressee. The children produced fewer, shorter, and simpler sentences when speaking with two year old children than when they spoke to adults or peers.

Anderson and Johnston (1973) investigated an eight year old child's speech in different situations - with an adult, a peer and with younger children. In communicating with younger children, this child talked at a slower rate with greater fluency, less complex surface structure, and higher pitch of voice.

Studies of six year old children (Hahn, 1948) and of eleven year olds (Houston, 1969) showed that the children used simplified syntax and short utterances when speaking to teachers and others in authority. When speaking to peers, on the other hand, they used elaborated and compound sentences. Helfrich (1979, p. 91) proposes as a possible explanation that children are afraid of failure when talking to adults to whom they ascribe a certain status and power and, in turn, fall back into well practiced speech. Another interpretation could be that the children merely reflect the way the adults are talking to them.

Modification of communication by deaf children in different communicative settings, has also been reported and will be discussed in the following chapter.

III.4 Language development in deaf children

Early prelinguistic patterns of interaction between the child and the caregiver are based upon mutual gaze, smiles and other facial expressions, touch, gestures, vocalizations and speech.

During the first year of life, the deaf child responds to these means of communication in the same manner as the hearing child. The development of communication therefore proceeds almost normally during the first year of life for the deaf child.

However, most deaf children, more than 90%, grow up in families where all other members are hearing. The use of hearing and speech are a natural means of communication in these families. If the families continue exclusively to use speech as their primary means of lingustic communication when the child is diagnosed as deaf, then the child will lack opportunities of a spontaneous language development (Nordén, Preisler and Heiling, 1979).

Education of the deaf has been intensively debated for more than a century. (For a review, Schlesinger and Namir (1978) is recommended. Nylander (1979) describes the status of the sign language of the deaf from a Swedish point of view.) The oral method - the use of speech, lipreading and the use of residual hearing - has dominated the education of the deaf in Sweden, particularly during the 50s and 60s, and is still dominating education of the deaf in most European countries as well as in many schools in the United States.

There are many reasons why the oral method has had such an impact on the education of the deaf. One of them has been the belief that the use of signs or fingerspelling would hinder the development of speech. This in turn was influenced by an earlier belief of linguists that a true language could only be spoken (Bloomfield, 1933). In fact language was by many equated with speech; a misunderstanding that has been the source of much difficulty for deaf people.

III.4.1 Studies of language development in orally trained deaf children

In a study of language development in deaf children, Schlesinger and Meadow (1972) reported that 75% of the orally trained children with a mean chronological age of 3:8 years on which data was collected had a language age of 2:4 years or less.

A study about the family behavioral patterns and the language development in deaf children in a strictly oral program has been conducted by Manfredi and Fruggeri in Italy (1978). The researchers studied twenty-five five year old deaf children. The aim was to assess the degree to which parents' personality and behavior influence the deaf child's psychological development. Observations of interaction between mother and child were conducted as well as interviews with the parents. The child was tested for psychomotor, affective, intellectual and linguistic abilities. The researchers identified four different family patterns, of which the two main patterns will be discussed here.

In families characterized by the first pattern, the children had a total developmental quotient near or equal to the norm for their age-group and a relatively homogenous profile in the various subtests. The mothers in these families were considered by the researchers as "good mothers". They adapted themselves in an active way to the children's needs, creating a rewarding environment. They were considered highly flexible, encouraging, nondidactive and permissive. The researchers also made the reflection that these mothers expressed pleasure and joy when referring to their child. Teaching speech was not emphasized in these families, even if speech was the primary means of communication. Gestures and other nonverbal means of communicative behaviors were used and understood by both mothers and children. These children received normal scores on language tests.

In families characterized by the second pattern, the children showed extreme variability in test results. These children were judged to be restless, impatient and inattentive in regard to activities that did not arouse their immediate interest. The mothers of these children were concerned about teaching them to speak. Messages expressed in nonverbal terms were not responded to. The speech of these children appeared like a "forced superstructure" to which the child had to resort, because he was prevented from communication by other means.

Manfredi's and Fruggeri's interpretation of their results is that speech (speech is my word, the authors have used the word "language", but in the meaning of "speech") does not guarantee communication at all. The results also indicate that parents who used the oral method in a rigorous manner, denying other means of communication reduced the communication substantially and interfered with the development of a joyful and gratifying relationship.

Greenberg (1980a) reports that highly competent oral families showed greater stress and a less positive attitude to their deaf child, than highly competent simultaneous communication families (i.e. families using speech and manual signs simultaneously). The children from "simultaneous" families received a higher estimated social age than the oral children.

Disturbances in the interaction between the deaf children and the caregiver caused by the tiresome experience of training the child's speech, has also been reported by Schlesinger and Meadow (1972).

Goss (1970) studied deaf children aged 2:5 to 5:8 years who were orally trained at home and in the preschool setting. Goss found that mothers of the deaf children were more likely to show dis-

agreement, tension and antagonism and give more suggestions than a control group of mothers of hearing children. The mothers in the control group were more likely to use questions, ask for opinions and use language showing solidarity and agreement.

Goss interprets his results in the following way:

> "The differences between the verbal behavior of mothers of the deaf and of the hearing are probably brought about by the desire of the mothers to communicate and the nature of the child's disability which makes communication difficult and frustrating" (p. 96).

Comparisons of the effect of both communication modes (oral versus oral and manual) and level of communicative competence (high versus low) on the play interaction of profoundly deaf preschool children and their hearing mothers were made by Greenberg (1980b). Their play was videorecorded. Greenberg's results indicate that the duration and complexity of the interaction were strongly affected both by the mode used and the level of communication. Mothers using a simultaneous method had interactions that were longer, more complex and which contained more cooperation and positive affect than those of the oral dyad.

Lenning (1974) compared the communicative ability of orally and simultaneously trained five year old deaf children. The children were shown two entertaining films. Each child was then asked to tell the content of the film to a peer in the presence of an adult. These interactions were videotaped. The children who used signs could tell significantly more about the film, and were better understood by their peer, than the orally trained children.

Twenty-three deaf children between six and fifteen years of age, from a school for the deaf in Denmark, were asked to tell a peer the content from a series of pictures of different degrees of complexity (Hansen and Kjaer-Sörensen, 1976). The children were videotaped when telling their peers about the content of the

pictures. The results showed that the younger the deaf child was, the more pantomime and mimicry was used in communication. Deaf children of deaf parents used less pantomime and more conventional signs than deaf children of hearing parents in the same age group. The deaf children of deaf parents were more competent in sign language than the other deaf children, and did not have to rely on pantomime or mimicry to the same extent.

Several researchers have reported that in spite of strictly oral programs, the children will develop a visual-gestural system for communication.

Tervoort and Verbeck (1967), making observations of deaf children in the Netherlands in the early 50s, found that orally trained deaf children when among other deaf children conversed in a relaxed and fluent manner with signs. Communication with the hearing on the other hand, revealed hesitations, awkwardness and embarrassment.

Lenneberg (1967) made observations of orally trained deaf children in the classroom setting, and found that the children would resort to gestures and signs when the teacher's back was turned.

Studies of young deaf children in oral programs, have shown that the children invent and use symbolic gestures in communication. Goldin-Meadow and Feldman (1975) studied four deaf children who were in the age-range between fourteen months and four years. The parents did not use signs in their communication, but had decided to concentrate on oral education. Repeated video recordings were made of these children during a period of four months. Each of the children developed an ideosyncratic system of gestures with the aim of communicating at a semiotic level. The authors found the same phases in this system of gestures as hearing children go through in speech development.

In the first phase the deaf children created lexical items to specify individual objects and actions. They used action gestures to symbolize actions as well as objects. This motor iconic representation system allowed the children to be fairly precise in their symbols (p. 277).

The second phase was characterized by the child specifying the relations between objects and actions by combining gestures into two-unit phrases according to his own gesture-order rule. There was also a third phase in which the deaf child combined more than two gestures in one phase in order to symbolize more than one semantic relation.

For these children, speech was obviously not an appropriate linguistic model, as each child developed his own gestural system. Goldin-Meadow and Feldman are of the opinion that semiotic communication can develop in spite of a profound deafness, and in the abscence of adequate linguistic models. It seems obvious though, that their language as well as their social, cognitive and emotional development will be impeded when the children lack adequate language stimulation at home and at school.

Skarakis and Prutting (1977) followed four children with severe to profound hearing losses. The children,who were between two and four years of age, were orally trained. Written transcriptions were made of the children's communicative acts as well as the context in which these acts occurred during a four week period. The results showed that the children exhibited semantic functions and communicative intentions in spontaneous communication. The semantic functions and the communicative intentions were the same as those Greenfield and Smith (1976) and Dore (1974) have identified in hearing children's communication.

III.4.2 Sign language

The use of signs was considered by many educationalists and linguists to hinder the development of speech and language. (The concepts of speech and language were in fact taken to be synonymous.)

Sign language was not considered to be a "proper" language but rather an iconic, very contextually bound means of communication without linguistic structure or syntax.

Brennan and Hayhurst (1980) have written a paper about the renaissance of British Sign Language. They introduce the topic with the following sentences:

> "Four hundred years ago, during the lifetime of William Shakespeare, a great debate was taking place on the worthiness and adequacy of the English language. Before that time, most of the important work in religion and philosophy, for example, had been written in Latin or Greek, and it was assumed that it was impossible to express abstract ideas and complex thought in English. Seen from the perspective of the twentieth century, this seems incredible" (p. 1).

The conception of sign language has been very similar to the conception of English, as Brennan and Hayhurst summarize it. Sign language was by hearing people assumed to be a system of gesticulations that could refer only to the "here and now" but impossible to use in expressing abstract ideas and complex thoughts. This opinion of sign language was most probably due to the fact that very few hearing people had neither studied nor learnt sign language but to the extent that it could be used to express contextually bound events - "the here and now".

During the last decades linguists from several countries have started to study the structure of sign language systems (e.g., Stokoe, 1972; Bellugi and Fischer, 1972; Bellugi and Klima, 1972; Hansen and Kjaer-Sörensen, 1976; Bergman, 1977, 1979, 1982; Siple, 1978; Namir and Schlesinger, 1978).

The results of this ongoing research show that sign language is a language like any other, with all the characteristics of a language. However, the syntax and the rules of sign language differ from the syntax and the rules of a spoken language.

Stokoe made the first attempt at a structural description of the basics of sign language during the 60s. This attempt was reported in 1972. Stokoe found that signs can be described in terms of a limited set of componential elements. In order to discriminate one hand sign from all others, critical information is required of at least three aspects: the configuration of the hand making the sign, the place where the sign is made, and the movements of the hand.

However, sign language should not be thought of as only a manual language performed with one or both hands; it also includes lip movements, facial expressions, mimicry, body posture and body movements which are important - sometimes crucial - for the meaning of a particular sign. The use of nonmanual components in sign language are now being studied (Baker and Padden, 1978; Baker, 1977; Liddell, 1978; Bergman, 1980; and Kjaer-Sörensen, 1980). It has been found that the use of such different components as puffing out the cheeks in reference to something big, or deictic gazes as a marker of referents also characterize sign language.

Liddell (1978) reports that when signing ASL*, the signer's face is much more active than when signing Signed English. This suggests that the

> "...heavy use of facial activity is not characteristic of sign language in general, or specific to individual signers, but may play a special role in ASL itself" (p. 59).

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*) ASL, American Sign Language, is the sign language used by the deaf community in the United States.

Another important feature of sign language is the use of localization. It can be described in the following way: when relating something, the signer draws a map, a picture of what he or she is going to describe, localizing the different persons, objects or actions to be part of the discussion in different places. When referring to these different persons, objects or actions a deictic gaze or a slight movement of the head in the direction meant, is enough to mark what is referred to.

For an overview of the research and the structure of sign language Namir and Schlesinger, (1978); Siple, (1978); Bergman, (1977, 1979); Wilbur (1979) and Klima and Bellugi (1979), can be recommended.

III.4.3 Studies of language development in deaf children with early sign language experience

Linguistic studies of deaf children of deaf parents as well as studies of deaf children of hearing parents using sign language in communication with their child, give another picture of the deaf child's language development, than the situation for the orally trained deaf children.

Deaf children of deaf parents who have used ASL in communicating with their child have been studied by Bellugi (1972), McIntire (1977) and Haestas y Moores (1980).

The results of Bellugi's studies made her suggest that deaf children learning sign language are regular, systematic and productive in their language development, just as were the hearing children she had studied earlier. Her opinion is that in spite of the differences in modality, the milestones of language development are the same in the deaf child as in the hearing child.

Maestas y Moores (1980) made a study of interaction between deaf mothers and their infants during the children's first six months of age. The infants were yet too young to make a definite assessement of their hearing status possible. Therefore some of the infants might have normal hearing, others not. Video recordings were made when the children were interacting with one deaf parent (in some cases with both parents) in such different home activities as bathing, feeding or playing. Four of the infants were videotaped from their first, second and third month respectively up to their sixth month of age.

Maestas y Moores observed seven different characteristics of parental strategy in interaction with infants. The parents were observed to:

1. frame their communicative symbolic action from more than one sensory channel: touch, vision and hearing
2. switch from one sense modality to another and also use two or more simultaneously
3. switch codes, using at times nonvocal acts as well as language* acts
4. express ASL by normal as well as by infant-adapted sign formation and express English by speaking and by signs or finger spelled words or both
5. use both unitary signs and sign phrases
6. use space to promote communication; positioning themselves to maximize their acts effect; moving, placing and touching the infant for same purpose
7. use objects in the environment in effective ways - to be what index refers to; to be part of actual or sign, to be incidental to signing.

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*) spoken acts (my remark)

Maestas y Moores comments that signing on the body of the infant was a strategy common to all parents in her study. This signing behavior has also been observed in an interaction between a nine months old deaf child and the hearing parents (Hülphers, in press). Not only parents use the strategy of signing on the body of their deaf child. In an observation of a deaf girl, 2:8 years old, the child is signing on the body of her doll (Hülphers, in press).

McIntire has studied the development of a deaf child's handshapes using ASL. At the beginning of the study, when the child was thirteen months old, she had a vocabulary of more than 85 signs. At twenty-one months of age, her vocabulary passed the 200 mark. When the child was fifteen months old she began to mark certain question forms with a general interrogative marker. The language development of this child showed conformity to many of the rules operative for all languages.

McIntire found that handshapes with features applying only to the thumb and index finger or to the whole hand are acquired earlier than those which require manipulation of the weaker fingers i.e., the middle, ring and little fingers. These results are in accordance with observations made by Ahlgren (1980 a and b) in her study of the language development of four deaf children, and by Hülphers (in press) in a study of cognitive and communicative strategies used by young deaf children.

Some of the studies conducted on deaf children have included both <u>deaf children to deaf parents</u> and <u>deaf children to hearing parents</u> e.g., Schlesinger (1972); Collins-Ahlgren (1975) and Ahlgren (1980a, 1980b).

Schlesinger (1972) has studied four deaf children's language development. Two of the children had hearing parents, two had deaf parents. One of the children with deaf parents was studied from the age of eight months until the age of twenty-two months.

This child, a girl, had more than 100 signs when she was nineteen months old. At this age, Lenneberg approximates the average vocabulary of a hearing child to about 50 words (1967).

Schlesinger emphasized that the style and feeling of linguistic input is of the same importance as the content. The enjoyment apparent in the language interaction between deaf children and their deaf mothers was in striking contrast to the interactions between many other deaf children and their hearing mothers (as was referred to in section III.4). Schlesinger suggests that understanding of early meaning, combined with an enjoyment of mother-child communicative events may represent a necessary feature of normal language development.

Samples of expressive language from a deaf child of deaf parents and a deaf child of hearing parents from the age of sixteen months to the age of almost four years of age have been recorded by Collins-Ahlgren (1975). Both children had been exposed to total communication i.e., signs, speech, finger spelling and natural gestures. These children's descriptive words initially related to their comfort or avoidance of discomfort and danger, and to control the behavior of others. Thereafter followed acquisition of words with semantic specifiers relating to their outside world. The children's first signs were usually simplifications of the adult model and were characterized as "baby signs". Collins-Ahlgren's observations made her conclude that these children were acquiring language in the same way as their hearing peers.

Ahlgren (1980a, 1980b) has studied language development as well as cognitive development in four deaf children, two of whom have hearing parents and two with deaf parents. When this research started in 1975 the children were between the age of ten and sixteen months.

All parents used sign language. To catch up with the deaf parents in sign language competence the hearing parents attended sign language classes held by deaf adults. Compared to the sign language of the deaf parents, the hearing parents' sign language was considered inferior with respect to grammar and vocabulary. When the children were between one and two years of age, this difference was noticable in the sign language of the children. But by the age of three, it was difficult to judge whose parents were deaf and whose were hearing, when studying the sign language of the children. Ahlgren comments on this in the following way:

> "...it is not the amount of linguistically correct interaction events that is crucial but rather the content, the attitude toward the child and that the child understands" (1980b, p. 21).

At the end of the previous chapter about modification of communication it was mentioned that this had been observed in a deaf child (Preisler, 1981). The child, a girl, was observed in four different settings when she was 4:4 years old. The girl was the oldest child of the hearing parents. The parents had started to use signs when the girl was one year old. They used signs and speech simultaneously in communicating with their daughter.

The child was observed when communicating with adults, with an infant and with a deaf peer. These interactions were video-recorded. Registrations of the girl's nonverbal and verbal behavior showed that the girl modified her way of signing depending on who was being addressed. With hearing persons the girl was signing slowly and with distinct hand movements as well as articulating every single word.

When communicating with a deaf infant - her younger sister - the girl modified her signs to an even more distinct level, using very slow hand movements and with the same type of explanations as adults use, as if she was teaching the infant sign language. Together with a deaf peer, who was also a competent signer, the children used sign language. Their communication was vivid; the

meaning of their verbal utterances was enhanced by the use of mimicry, pantomime, gestures and body gestures. The communication between the two children was smooth and effortless, in contrast to the sometimes painstakingly slow conversations with the adults. The two childrens' conversation was free from misunderstandings and, moreover, the content was at a much more advanced level.

Studies of language development in deaf children with early sign language experience referred to in this chapter, show that these deaf children start to express themselves verbally at an earlier age than hearing children. Whether these results are due to differences in methodological approaches or due to a gestural-visual channel being easier than speech when transforming wishes, feelings or demands to a verbal form is yet an open question.

In studies of language development in hearing children, focus has until recently only been on the children's spoken utterances. If these children's production and understanding of spoken words and their use and understanding of gestures, pointings with the eyes, body postures etc, were registered and analyzed, we might find many similarities in deaf and hearing children's early language development.

On the other hand, young hearing siblings of deaf children in hearing families using signs in communication, have been observed to start express themselves in signs before they use speech (Ahlgren, personal communication). Observations of this latter kind favor a view that a gestural-visual channel is more easily called upon than speech.

Systematic studies of language development in hearing children with deaf siblings and/or with deaf parents, with analyses of the children's use of gestures, signs and speech are needed to shed light on this issue.

III.5 Summary

Detailed studies of mother-infant interaction have given new insights to the infant's active role in the communication process. These studies have also had an impact on child language research.

Traditionally, linguists and child language researchers started studies of language development at the time when the child uttered the first words. Neither the prelinguistic stages in the development of language, nor the context in which the words were uttered, nor the nonverbal expressions used in combination with the verbal utterances, were included in the analyses of the language development of the child.

Communications occurs in interactions with the social environment. Communication is a mutual process, where all interactants adapts to one another. In earlier child language studies, only the child was in focus for the research. To get a more complete picture of how the child's language develops, the way the caregiver speaks and behaves in interaction with the child must also be included.

Studies of mother-infant interaction have shown how even the neonatal infant is able to take part in communication with the caregiver. Gradually, rules of interpersonal interaction develop between infant and caregiver. These rules develop from a simple structure of communicative behaviors between infant and caregiver by means of mutual gaze, smiles, body movements to a sophisticated pattern of nonverbal expressions.

When the child has reached the age of about one year and successively starts to use vocal-verbal means of communication, the child has already acquired a substantial knowledge of the art of communication: the complex system of rules in social interaction.

Language alone is not a sufficient carrier of all the meanings in interpersonal communication. Gaze, mutual gaze, smiles, raised

and lowered eyebrows, pointings and various gestures with the hands but also with the head and the whol, body play important roles in communication. Not seldom do these expressions "tell" more to the partner, than words.

> "For all their tremendous value, words are only pale shadows of the things they represent" (Hill, 1963, p. 19).

When educationalists strongly advocated speech- and auditory training as the only means of communication with deaf children, they disregarded the importance of nonverbal expressions in communication. Gestures and other nonverbal expressions were thought of as hindrances for speech development. Speech, by many, was regarded as equivalent to language. Consequently, the use of gestures and other nonverbal expressions was thought of as a hindrance for language development.

Studies of language development in deaf children with early sign language experience show that these children start to use signs in communication before or around the age of one year. The language acquisition process of signs show many similarities with the hearing child's acquisition of a spoken language. Strictly orally trained deaf children on which language tests have been applied, generally show a delayed language development. Available data show that their vocabulary of words is much less than hearing children's vocabulary of words in compatible ages and also less than the vocabulary of signs of deaf children with early sign language experience. Several researchers have also reported about disturbances in the interaction between orally trained deaf children and their parents, which is explained as caused by the tiresome experience of training the child's speech.

Studies of deaf children with early sign language experience have shown that these children start to express themselves verbally at an earlier age than hearing children. These results are discussed as either due to the differences in research methods used, or due to a gestural-visual channel being easier to use than speech for the young child.

IV. NONVERBAL COMMUNICATIVE BEHAVIOR IN SOCIAL INTERACTIONS IN CHILDHOOD AND ADULTHOOD

In the preceeding chapters the importance of mutual gaze, facial expressions, gestures and other nonverbal communicative behaviors in early interaction was discussed.

A commonly held view has been that when the child grows older the use of nonverbal behaviors, in particular the use of hand and arm gestures, will diminish. Nonverbal communication between human beings was earlier often considered to be synonymous to the use of hand and arm gestures. The assumptions have been that nonverbal communicative behaviors are nothing but early precursors of later verbal forms and nothing but primitive substitutes for more complex verbal forms. These assumptions are probably derived from case-study observations of very young children who were in the process of acquiring verbal communicative skills (see Werner and Kaplan, 1963, for a review). These early observations of children conducted some seventy to eighty years ago, followed by studies as late as the beginning of the 70s (Abecassis, 1973) show that nonverbal communicative behaviors such as pointings and pantomime occur prior to verbal communication forms and that some of these seem to disappear from the child's repertoire when more complex verbal forms appear.

Until recently, there have been very few studies about children's use of nonverbal communicative behavior, using detailed observations and analyses. Jancovic, Devoe and Wiener (1975) state that this fact might be due to the tendency of many researchers to overgeneralize the results of these early observations, inferring that since some nonverbal behaviors were precursors to later forms or simple substitutes for more complex verbalizations, all nonverbal communicative behaviors could be considered as primitive precursors to or at least substitutes for verbal communication.

During the last years, however, studies of nonverbal communicative behavior - in childhood as well as adulthood (infancy has already been discussed) - have increased rapidly. An important, and probably the most important, reason for this is that today film and particularly video, are easily available and not very costly research tools. It is almost impossible to register nonverbal communicative behaviors in social interactions without the repeated observations made available by the use of video or film.

Detailed observations and analyses of behaviors from film and video have shown that the use of nonverbal communicative behaviors does not diminish with increasing age. Rather, that the behaviors change with increasing age reaching a more sophisticated and varied level (e.g., Kendon, 1976, 1980; Condon, 1979; Jancovic, Devoe and Wiener, 1975).

IV.1 Definitions of verbal and nonverbal behavior

The word verbal can be traced to the Latin word "verbum" meaning word. It's meaning has come to cover the word language as well. As with the concept of communication, there is no definition of language - verbal - that everyone agrees upon. However, there are certain characteristics that can be outlined (Freeman, Carbin and Boese, 1981), which also is the way the concept will be used in the present study: language is an arbitrary code; is symbolic and systematic. Most sentences are not memorized, but created according to rules that the users share. Language has grammar and meaning. Previous research about language has mainly covered speech which is why the term verbal has been used primarily to mean different forms of speech. But today, sign language is recognized as a verbal language.

The term nonverbal was introduced in the 50s by psychologists. Linguists usually use the terms non-linguistic, extra-linguistic or para-linguistic. The term nonverbal communication has been used for different expressions like body movements, gestures,

visual behaviors, facial expressions, self stimulation and physical distance important in communication but not directly assigned to verbal communication. Hair, clothes and make-up have also been included in the concept "nonverbal communication" (e.g., Duncan, 1969; Ekman and Friesen, 1969; Scheflen and Scheflen, 1972; von der Lieth, 1973).

Intonation, pauses and pitch of voice which were earlier considered to be parts of nonverbal communication are today regarded as being part of speech production.

The term "nonverbal" has been discussed and criticized. Bullowa formulates the criticism in the following way:

> "The very term non-verbal communication, introduced recently to cover a wide range of extra-linguistic human communicative modalities, emphasizes by its negative form the supremacy of verbal communication in our habits of thought" (1979, p. 12).

Hand, head or body gestures as well as other body movements or facial expressions, are all defined as "nonverbal". When studying social communication between hearing persons this definition is, in most instances, valid. When studying communication between deaf persons, what is nonverbal and what is verbal is not clear, however.

Baker (1980) discusses how to distinguish between the verbal and nonverbal parts of sign language. One way could be to make a distinction from the form or channel. According to such a definition everything not produced by one or both hands, would be regarded as nonverbal parts of communication. But sign language performed without facial expressions, lip movements and body movements lack meaning (as they often do in spoken languages as well).

A distinction according to communication channel is therefore regarded by Baker as uninteresting. Possibly a more useful way to distinguish between nonverbal and verbal is to regard the function different body parts and expressions have at a certain point in time.

> "I think that research on nonmanual behaviors in different signed languages clearly indicates the need for a careful discription of all patterened behaviors occurring in the context of signing - that is behaviors of the eyes, face, head, and their body posture as well as the hands and arms. From this careful description, we can then begin to test out the behaviors for their significance is the communication and conventionality in the language" (Baker, 1980, p. 48).

In this study a distinction of what is "verbal" and what is "nonverbal" will be made from the context in which the behaviors occur, not from the form or channel.

IV.2 Different research approaches to the study of nonverbal communicative behavior in childhood and adulthood

There has for a very long time been an awareness that nonverbal behaviors play an important role in human interaction, although many considered them too complicated to investigate. There has also been, and still is, a very strong orientation towards verbal communication in our society which has made the study of nonverbal means of communication less important. Research on nonverbal communicative behavior has further been complicated by the wide range of behaviors that are nonverbal. Moreover, many different channels are involved in even the most simple communication, which has complicated the research.

Most research that has been done in the nonverbal area falls into two major categories described by Duncan (1969) in a paper that today is considered almost classical in the field of nonverbal research. These two major research approaches are named the "structural" and the "external variable" approaches.

The "structural approach" is largely descriptive, relying on observational rather than experimental data. Researchers in this field (see, for example, Birdwhistell, 1970; Scheflen, 1963, 1964, 1965) seek to uncover the internal rules and units of nonverbal communication much as a linguist would in the study of

verbal languages. Within the structural approach researchers have been particularly interested in rule organized behavior (Goffman, 1956; Kendon, 1967, 1972; Duncan, 1972; Duncan and Fiske, 1977).

The second approach, by Duncan called "the external variable approach", by Weitz (1979) labelled the "clinical approach", involved looking for systematic relationships between nonverbal behavior and some psychological state, as well as between nonverbal behavior and the perception of meaning (see Mehrabian 1972; Ekman, Friesen and Ellsworth, 1972).

Weitz (1979) adds a third approach, "the psychoanalytic approach", which she believes is "the heart of the popular approach to 'body language'"(p. 98). The idea in the psychoanalytic approach is to detect a "secret" language of the emotions by attending to the nonverbal behaviors of others. An advocate of the psychoanalytic approach is, among others, Kestenberg (1965).

This third approach focuses primarily on individual differences in nonverbal behavior, and only secondly on regularities across people or groups. It is a more personality oriented approach since it looks at aspects of nonverbal behavior - skill or style - that are considered to be somewhat enduring characteristics of a person.

IV.3 The use of gaze and mutual gaze in social interactions

> "Since mutual gaze is the context for a great deal of communication in other modalities at the beginning as well as throughout life, it should be considered a very fundamental form of human communicative behavior" (Bullowa, 1979, p. 24).

IV.3.1 Child-child interaction

Studies of child-child interaction in nurseries and kindergartens particularly by ethologists, have shown that sending and giving gazes are important indications of the child's status in a group.

Abromovitch (1976) found that children who got many gazes from other children often were at the top of the hierarchy. This "upward" pattern of looking has been used as an index of "attention structure" (Chance and Larsen, 1976).

Vaughn and Waters (1981) made direct observations in a preschool class during free play throughout one school year. Ranks based on distributions of visual regard among peers and sociometric scores showed that attention, rank and sociometric preference were highly correlated.

McGrew (1972) studied children in the age group of three to five years when they were introduced to a nursery group. He found that the new children in a group observed the other children's play and avoided eye contact. If the newcomers were contacted by other children, their usual response was to look down or away. These patterns of eye movements disappeared after some time in the nursery group.

Detailed descriptions of children's behavior, including different gaze behaviors, have been made in natural situations in preschool settings by ethologists (e.g., Blurton Jones, 1971, 1972; McGrew, 1972; Brannigan and Humphries, 1972).

In most of these studies the children's behavior has been calculated for frequency of occurrence for each child and different statistical analyses have been applied to the data. Processing the material this way, i.e. without considering that behaviors occur in temporal sequences both in relation to one's own behavior as well as in relation to the partner's behavior, has not given much information of patterns of interaction between children. For example, there have been no studies to date with detailed observations and analyses of the use of gaze and mutual gaze in conversations between children.

IV.3.2 Adults in interaction

Systematic studies of the importance of visual behavior in social interactions between adults were not initiated until the beginning of the 60s. Considering the very important role today attributed to visual behavior in communication, this is surprisingly late. In psychoanalysis the impact of eye contact was observed early. One of the reasons Freud sat at the side of his client was said to be to avoid eye contact.

The first studies were carried out in the United States by, among others, Nielsen (1962) and Exline (1963), and in England by Kendon (1967), and Argyle (1969).

Studies of adults in interaction, particularly during conversations between two persons, have shown a regularity in their visual behavior. Argyle (1975) found that while a person is talking he looks at the listener 40% of the time. The listener in turn looks at the speaker 75% of the time, i.e., the speaker looks less at the listener than the other way around.

A couple of years later, Duncan and Fiske (1977) report the same proportion of speaker's and listener's visual behavior, although the amount of gazes were higher in their studies (60% for the speaker and almost 80% for the listener). Such large variations in the results can only be interpreted when the context in which the conversation occurs, is taken into account.

Exline and Winters (1965) report for example that the more intimate the topic of the conversation, the less eye contact of both participants.

Other important factors in studying visual behavior in communication is the relationship between two persons. We tend to look more at people we like than at people we have a more neutral or negative attitude towards. Mehrabian (1972) reports that people

receiving many gazes from others in a group of people, consider themselves more popular than others. Cook and Smith (1975) have reported similar results. A more dominant person in a dyad usually looks more at his partner than vice versa and is also the first to break the contact (Chance, 1967).

In conversation with other people, we tend to avoid speaking at the same time as our partner. A conversation is characterized by a talking-listening pattern, a turn-taking. This turn-taking, described by among others Kendon and Cook (1969) and Duncan and Fiske (1977), is rule-governed. We are usually not aware of these rules, if we are not reminded of them or if they are violated. This regularity during conversations usually has the following pattern:

First there is an initial phase of eye contact. The person who starts talking indicates this by a slight change in body posture, a shift in the facial expression, a head movement or a vocalization. The partner indicates by small signals of the body and the face that he or she is expecting the partner to start talking. The person who talks usually looks initially at the face of the partner, at the eyes or mouth region, then at a point at the side, downwards or upwards in relation to the listener. This might be a way of avoiding interruptions by the listener. "Take the floor" is an expression used in this context. A person who directs his gaze towards the floor is usually considered to be "holding the parole" in cases when he cannot find the right words, but does not want to be interrupted. This can also be made by prolonged vocalizations, coughs etc. The pattern of looking at the side, upwards or downwards in conversation can also be explained by the fact that we often have a mental image of what we are talking about.

We "see" in front of us what we are telling the other person. When the speaker is approaching the end of his speech his eyes are directed back to the listener. Small changes in pitch of

voice, head movements and/or body movements or body postures give information to the listener that it is his or her turn to "take the parole". The procedure is repeated, but the roles change.

IV.4 The use of facial expressions in social interactions

The face is considered the most important channel of nonverbal communicative behavior. We attend almost exclusively to the face in communication, and we are aware of our own facial appearance as well.

Research on facial expressions was made during the nineteenth century by Charles Darwin*. His work "The expression of emotions in man and animals", based on more than thirty years of observations, was published in 1872.

Darwin's contribution to the study of facial expressions in human beings was based on research of animals and on diary observations of his own children from infancy. From these observations Darwin drew the conclusion that human expressive behavior was for the most part innate.

Darwin's "nature" position in the debate of nature versus nurture in the genesis of behavior is shared by many ethologists like Tinbergen (1951), Lorenz (1966) and Eibl-Eibesfeldt (1970(a)).

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*) A publication on facial expressions in man was made by Charles LeBrun "Chancelier et Directeur de l'Academie de Peinture et de Sculpture" in Paris during the seventeenth century. He depicted facial expressions for different emotions. An English anatomist later pointed out that the faces LeBrun had painted showed tension in muscles not present in the human face (de Rochas, 1900).

Eibi-Eibesfeldt has conducted several cross-cultural studies and has found similarities in basic emotional expressions. One example is the "eye-brow flash" i.e., the way we raise our eyebrows with a rapid movement, holding the eyebrows maximally raised for approximately 1/6 of a second. This expression as well as flirting behavior seems to be characteristic of all cultures studied (Eibl-Eibesfeldt, 1979).

Further evidence of the nature position comes from studies of congenitally deaf and blind children (Eibl-Eibesfeldt, 1970(b)). Characteristic facial displays of smiling, anger and affection, which were indistinguishable from the expressions of normal children, were found and at the appropriate ages.

LaBarre (1947), Birdwhistell (1967) and Leach (1972) are considered the most prominent predecessors of the opposing view; that facial expressions as well as many other nonverbal communicative behaviors are culturally based.

Birdwhistell (1963, 1967) holds the position that no expressive movement has universal meaning and that all movements are products of cultures and not biologically inherited or inborn.

During the 60s, Paul Ekman and his associates made cross-cultural studies in the United States, Brazil, Chile, Argentine, Japan and New Guinea, where people were asked to judge different emotions from pictures of facial expressions. The results of these studies showed, according to Ekman (1973), that Darwin was correct in claiming that there are universal facial expressions of emotions. But facial expressions vary across different cultures in at least two ways. What elicits an emotion usually differs between different cultures. Cultures also differ in the conventions people follow in attempting to control their faces in different social situations. An illustration of this can be taken from Japan. If a person is mourning he would, according to Western cultural conventions, cry or at least have a sad facial display. In the

Japanese culture, however, the mourning person tends to laugh or smile when telling about his or her situation in a social context. This is the convention in these situations and has the purpose of not embarrassing the addressee.

Ekman (1972) has developed a "neuro-cultural" theory of facial expressions of emotions. He advocates:

> "...both an innate basis for the connection between certain emotional states and given facial muscles... and a cultural overlay of display rules which can intensify, deintensify, neutralize, or mask the facial display to comply with the normative demand of specific situations in a culture" (op cit Weitz, 1979, p. 24).

Ekman's position is shared by many other researchers today.

IV.4.1 Child-child interaction

There has been much less research on facial expressions in children than in infants and adults. Charlesworth and Kreutzer (1973) state that most researchers seem to have preceeded on the implicit assumption that once established in infancy the form of facial expressive behaviors change little over the years.

Ethologists, however, studying child-child interaction have described different facial expressions displayed by children in interaction. Blurton Jones (1971) has worked on setting up criteria for use in describing facial expressions in children. He has also described children's use of different behaviors in play situations. He describes, for example, the "play face" defined as smile with open jaws with or without laughing, a face often displayed in "rough and tumble" play. In "rough and tumble" play the children move around, wrestling, running, jumping and hitting one another. This play is more frequent between boys than between girls and must not be confounded with a fight. In a fight there is no display of a "play face", but rather a tense facial expression.

Zivin (1977) reports about a facial expression labelled the "plus face". This facial expression is characterized by lowered eyebrows, direct eye contact, face thrust forward and compressed or bared lips. It is a facial expression used by children, especially boys, at the start of an encounter with other children and has been found to strongly predict the outcome of the encounter, i.e. the face maker will win.

The "plus face" looks like a face ready for action and contact. It resembles the facial expression that McGrew (1972) described as an aggressive face, and is also similar to the " threat face" reported in nonhuman primates. Zivin found that the "plus face" tends to be shown more to individuals near one's own rank, than to those farther away.

Children as young as five or six years can recognize facial expressions of such emotions as happiness, sadness, anger and fear (Ekman and Friesen, 1971; Izard, 1971). Studies of certain specific facial expressions frequently preceeding or accompanying children's aggressive behavior, suggest that children observing such expressions in a conflict situation might interpret them as signalling the likelihood of an attack and this interpretation might affect their subsequent behavior toward the partner.

But most studies of facial expressions in children, as well as many other studies of children's use of nonverbal behaviors have focused on the overall use of different behaviors, rather than on relationships between one child's behavior or expression and the partner's response to this behavior in dyadic encounters.

Camras (1977) explored the possibility that the use of aggressive facial expressions by one child is related to both the own subsequent behavior and that of the interactional partner. Seventy-two pairs of children of the same sex and aged between five and six and a half years, participated in a brief play session in which conflict was induced by providing an object with which only one child could play at a time. These encounters were video-

recorded and the results indicate that facial expressions play an important role in conflict encounters between children. Facial expressions can carry information relating to the subsequent behavior of the child who produces them and can influence the behavior of the child who observes them.

IV.4.2 Adults in interaction

The face provides three types of signals according to Ekman and Friesen (1971): static, slow and rapid signals. The static signals are, for example, skin color and complexion. Slow signals are characteristics of our faces of a more permanent nature, for example, wrinkles around the eyes or forehead. The rapid signals are produced by the movement of the facial muscles resulting in temporary changes such as raising the eyebrows. These changes flash on the face for a matter of seconds or a fraction of a second.

According to Argyle (1975) facial expressions give information of three different kinds:

1. Personality characteristics. We usually tend to interpret other people's personality characteristics from the look on their faces. In a similar way we present ourselves to others. Injuries or deformations of the face are therefore considered as a severe social handicap (Montagu, 1971; MacGregor, 1974).

There are many different features of the face which affect impressions of personality. Secord, Dukes and Beran (1959) asked subjects to judge personality characteristics from photographs of males and females. They found, for example, that a person with thin lips were judged as conscientious, while having thick lips on females were judged as sexy. High forehead was judged as a sign of intelligence and protruding eyes as excitable.

2. Emotions The way we feel, the mood we are in, is usually displayed in our faces. The face is considered the most important part of the human body for showing emotions. Intensity of the emotion experienced can usually be judged from the body movements.

Many studies of emotions in human facial expressions have been conducted since Darwin's work was presented. The preferred method of investigating facial expressions has been to use photographs of people posing in different emotional states. Information of context was not given to the judges who were given ready-made categories of judgements. The results of these studies showed very little consensus between different judges.

Landis (1924) tried to improve the methodology. Instead of asking the person to be photographed to look sad, angry or happy, Landis wanted to get the subject to experience these different emotions. However, Landis's results did not show any good consensus between different judges, either.

Osgood (1966) asked judges to identify forty different facial expressions. Cluster analyses revealed seven main groups of facial expression. Osgood's results as well as the results of research by Ekman and Friesen (1975) and others, indicate that there seems to be seven main facial expressions for emotions that reach high interjudgment agreement. These are: happiness, surprise, fear, sadness, anger, disgust and interest.

3. Interaction signals Facial movements of the speaker and the listener are essential signals during human verbal interaction. These facial movements differ from emotional displays in being fast, lasting a second or only a fraction of a second and involving only part of the face. They also differ in respect of having referential meaning and in being syntactically structured. Duncan and Fiske (1977) and Ekman and Friesen (1969) referred to these signals as regulators:

"...acts which maintain and regulate the back and forth nature of speaking and listening between two or more interactants" (p. 82).

Duncan and Fiske (1977) describe the mechanism of turn-taking in terms of signals by which the speaker and the listener indicate their respective states with regard to the speaking turn. Studies by, among others, Scheflen (1963), Exline, Gray and Schuette (1965), Kendon (1967), Wiener, Devoe, Rubinow and Geller (1972), Argyle, Ingham, Alkema and McCallin (1973), Duncan and Fiske (1977), have demonstrated that such signals or regulators are employed systematically with predictable results. Studies of deaf people communicating in ASL (Baker, 1977) indicate that turn-taking in the context of sign is as systematically structured and as highly developed as it is in other language cultures.

IV.5 The use of hand and arm gestures and body movements in social interactions

IV.5.1 In childhood

Generally in the past, opinion about hand and arm gestures has suggested that gross movements and deictic pointings diminish with increasing age and increasing linguistic competence in children (e.g., Werner and Kaplan, 1963).

In the 1970s, Jancovic, Devoe and Wiener (1975) studied the development of children's gesture behavior to determine whether the production of nonverbal forms of communication parallels the linguistic development in children and increases in frequency and complexity with increasing age. They measured the frequency and type of gestures produced by sixty subjects at four to eighteen years. After the children viewed a cartoon story, their use of gestures was measured while they described what they had seen to the experimenter. Three general categories of communicative hand and arm gestures were studied, namely:

- deictics - pointing movements denoting or specifying the spatial location of a concrete object or event
- pantomimics - movements which copy or mimic visual or kinesthetic attributes of a concrete object or event
- semantic modifying and relational hand and arm movements
  a) semantic modifiers: movements which add modifications, amendment or contrast to the context in the verbal channel
  b) relational hand and arm movements: movements which add to the communication in the verbal channel some information between the addressor and addressee, as viewed by the addressor (p. 924).

Some of the results from their study showed that as the ages of the children increased, the number of gestures that were produced increased as well. The older children produced a greater percentage of semantic gestures, which Jancovic et al considered more complex than either deictic or pantomimic gestures. All age groups produced few deictic gestures which could have been due to the limited opportunities for deicitic pointing in the story-telling task.

Studies of mother-child dyads have shown how the mothers tend to adapt their way of talking to their child's linguistic competence (Nelson, 1973; Waterson and Snow, 1978; Snow and Ferguson, 1979).

Gutmann and Turnure (1979) used the Jancovic, Devoe and Wiener study as a model for a study of mothers' production of hand gestures while communicating with their preschool children under various conditions. The objective of their study was to test whether mothers adapt their gestures in the same way as they adapt their linguistic input when communicating with their children.

The children were aged between 1:11 and 3:3 years in the younger group and between 4:1 and 4:5 years in the older group.

The result of the study showed that the mothers did make adaptations in their gesture behavior depending on the age and the developmental level of the child. These findings support the hypothesis of Jancovic et al, that gesture behavior is not

necessarily a more primitive means of communication, nor merely a precursor to more complex means of communication as Werner and Kaplan (1963) hypothesized in a developmental analysis of deictic gestures.

Although some gesture types, for example pointing, may occur prior to verbal forms of communication, gesture forms of communication increase in frequency and complexity with advanced developmental levels and parallel the development of linguistic communication.

Janovic et al, started to study children's gestures at the age of four years,i.e. at an age when the child normally has the ability to manage a linguistic system. Volterra (1981) studied younger children at an age when they normally start to use a vocal code, and compared their use of gestures with the use of gestures by a deaf child to deaf parents exposed to sign language from birth. Three hearing children were observed from 0:9 to 2:3; from 1:8 to 2:0 and from 2:0 to 2:6 years of age respectively. The two oldest children were chosen to participate in the study because they exhibited a gestural communication much richer than their verbal production. The deaf child was observed from 2:0 to 2:6 years of age. The method used was diary accounts from parents and periodic videotaped sessions.

In analyzing the production of gestures, Volterra distinguished between the production of deictic gestures - pointing, giving and showing - and referential gestures.Deictic gestures express the child's communicative intention, while the referential meaning is given only by the context where communication takes place. Referential gestures represent stable referents and their meaning is conventionalized by the child and the caregiver. The referential gestures appear later than the deictic gestures.

The results show that there were many similarities between the two oldest hearing children and the deaf child in gesture production. The youngest hearing child, however, produced very few gest-

ures. Volterra makes the comment that we might expect individual differences in the use of gestures in hearing children. Both the two hearing children and the deaf child used a combination of deictic and referential gestures and words, while the hearing children showed progressively more combinations of gestures and words, which was not found in the deaf child.

There was an important difference between the deaf child and the hearing children in their use of combinations of two referential (symbolic) gestures. The deaf child was the only one to produce two referential gestures.

Volterra interprets from these results that the hearing children show the capacity of using symbols in both modalities - vocal and gestural. But that they do not combine two gestural symbols, rather when they show the capacity of combining two symbols they have reached the age when the vocal modality takes over.

To support her findings that the deaf child was the only child to use two referential gestures, Volterra looked through all the phrases used by the deaf children studied by Goldin-Meadow and Feldman (1975), reported as well in Feldman, Goldin-Meadow and Gleitman (1978) discussed in section III.4.1 (the deaf children were orally trained). But she could not find any combination of the two symbolic gestures in these deaf children.

Volterra found a general ability to communicate in children, independent of whether they were deaf or hearing, and independent of whether they used a vocal and/or gestural modality. This communicational ability is not directly dependent on the exposure of a linguistic input. But if the linguistic input is inadequate or lacking when the child is normally supposed to start combining symbols, the child will not have a lingusitic model to combine symbols. Or as Volterra puts it, the child will not manage a real linguistic system.

Considering the results by Jancovic, Devoe and Wiener (1975) who studied older children - from four to eighteen years of age - and Kendon's studies of adults'use of gestures (1976, 1980) the use of nonverbal expressions will probably not disappear when the child starts to use a vocal modality. Rather, there could be a latency period when the child changes from one modality to another, and thereafter the child will use a more sophisticated gestural system. There are no detailed studies of hearing children's use of gestures between the age-range of two and a half and four years. A study of hearing children's use of nonverbal expressions will hopefully shed some light on these questions (Blohm, under preparation).

IV.5.2 In adulthood

One of the most cited works on hand gestures in adults has been carried out by Efron (1941). Efron studied the gestural system of first and second generation Eastern European Jews and Southern Italians in New York City. He made a descriptive study of hand gestures of these ethnic groups and found effects of assimilation of nonverbal behavior. Efron's primary interest was anthropological, not psychological. One of his great contributions in this field was to isolate gesture as a field worthy of study and to indicate the effect, or the social process, of assimilation on the use of gestures. Efron's technical equipment for studying gestures consisted of paper and pencil.

There are different types of gestures. Some are closely linked to speech while others have nothing to do with the ongoing verbal communication. Ekman and Freisen (1969) have classified hand gestures in different categories: emblems, illustrators and adaptors. Emblems and illustrators are distinguished from movements in which the individual touches or manipulates hos own body or clothing, selfadaptors. Emblems are the gestures that can be translated to a single word or a phrase. According to Ekman and

Friesen, emblems are usually conventionalized movements. Illustrators are contextually bound, referring to or illustrating what is being said.

When a person speaks, he is at the same time moving several parts of his body. These movements can be very slight movements of the eyes or the eyebrows. But a person who speaks is, almost without exception, moving his arms and hands. Arm and hand movements are considered to be very closely linked to the activity of speaking.

> "Most workers have been explicit in noting that gesticulation as we here refer to it, is to be distinguished from other kinds of bodily movement that can be observed in interaction and several studies show clearly that it is an integral part of speaking" (Kendon, 1980, p. 207).

Movements closely associated with speech seem to be phenomenally distinct from other movements. Kendon (1976) illustrates this in a study where twenty individuals were shown a film shot in New Guinea where one person is addressing a large gathering. The subjects in the study did not hear the sound track of the film and were afterwards asked to describe what movements they saw the man make.

All of the twenty subjects recognized that the person on the film was speaking to a large gathering. They recognized the same segments of movements as being related to his speech. These movements were distinguished from other movements that had nothing to do with his speech. Self-touching, postural movements, movements involved in the manipulation of an object, were regarded as being quite separate.

Detailed studies of the flow of movements in relation to speech have been carried out by Kendon (1967, 1976), by Condon and Ogston (1967) and by Condon (1979). These studies indicate that an individual, while speaking, acts as a whole. Speech is not a disjoint action system, but continuously mobilizes the muscular system of the whole body (Kendon, 1980).

Films of speaking people have been analyzed by Kendon using microanalytic techniques. He noted that the speech stream of the person was matched by a distinctive pattern of bodily movement. Further studies and detailed analysis from films show that gesticulations appeared somewhat in advance of the appearance of the speech phases with which they were associated. In certain instances they appeared simultaneously, but they never followed the associated speech acts. Gesticulation can therefore not be regarded as a product of speech. Gesticulation and speech work together in intimate relation. According to Kendon (1980) gesticulation is not composed of elements which are formed into constructions according to a syntax. Rather, they occur as a succession of enactments whose sequencing is governed by the order of presentation of ideas in the discourse. It appears that the process of thought often involves operations on mental images which directly parallel physical operations on actual objects (Metzler and Shephard, 1974; Huttenlocker, 1975).

Blass, Friedman and Steingart (1974) studied hand movements during speech in congenitally blind individuals. They found that in the blind, the movements of the hands consisted of movements of the fingers continually touching themselves. In the blind, the mental representation is to a large extent haptic, while the sighted person's mental representation is of a more spatial character.

It was earlier said that we show our emotions in different facial expressions. The intensity of these emotions are often expressed in body postures and body movements. In theater, ballet and dance, body movements, body postures as well as gestures and facial expressions play a central part. In the classical Chinese pantomime theater, four different body positions with variations are used as the basic postures in showing all human feelings and states of mind. These positions are labelled the serpentine, the bird, the hippopotamus and the tiger.

Choreographers like Laban (1956), Benesh and Benesh (1956) and Eshkol-Wachman (1958) have all studied the human body and developed a notation system to be used in ballet and dance. Within dance, the Benesh system is most widely used. The Laban notation system has had the greatest impact on the research of nonverbal communication, but is not used by choreographers. (The Laban notation system includes about twenty thousand body positions.)

The Eshkol-Wachman (1958) system records movements in much the same way as music is recorded on a score, with different lines for different body parts, and duration shown on the horizontal axis.

A similar system has been constructed by Sutton (1973) and later used to describe the sign language of the deaf. She showed how the signs as well as the body postures and other body movements could be transcribed on a five line music notation system (Sutton, 1975). But this system has not been used by other researchers in transcribing the sign language of the deaf.

IV.5.3 A gestural origin of language

Wundt (1973, original edition 1921) considered gestures to be a primitive form of language, arising out of emotional states. Hewes (1978) supports this position and states that the roots of language are to be found in the use of our hands. This gestural theory of the origin of language was suggested as early as the nineteenth century by Alfred Russel Wallace and Edward B. Taylor who are considered to be the fathers of anthropology (op. cit. Hewes 1978). Bruner (1975) sees language emerging initially in support of and loosely linked with action, especially manual action. Joint attention and joint action are, according to Bruner, important prerequisites for the emergence of language.

von Raffler- Engel (1975) draws the conclusion from studies of children that speech and gestures develop together as part of a communicative whole. Body movements (kinesics) associated with a spoken language are learned from the caregiver, from peers and adults in much the same way as the structure and semantic content of the speech language.

As children mature they gradually begin to acquire the characteristic speech and gesture pattern of their communicative group. The notion of a gestural origin of language was first rejected by Kendon (1976) but his later work on gesticulation and speech has made him change his mind.

> "The fact that gesticulation tends to anticipate speech, that speech may be readily disrupted when concurrent gesticulation appears to go forward smoothly, and the fact that on occasion a gestural response may be given first before any speech whatever is begun, does perhaps provide a hint that the gestural channel is easier and more readily called upon, that the process by which an idea is transformed into linguistically functioning public behavior is more swiftly accomplished gesturally, that there are fewer steps to the process than there are when a formulation of the 'idea' into speech language is to occur" (1980, p. 226-227).

The intimate linkage of hand and speech was in fact a knowledge practiced already during ancient ages, in Greece and in the Roman empire by rhetorics. John Bulwer (1644) formulated the linkage between hand and speech in the following way:

> "...the moving and significant extension of the Hand is known to be so absolutely pertinent to speech, that we together with a speech expect the due motion of the Hand to explaine, direct, enforce, apply, apparrell, and to beautifie the words men utter, which would provide naked, unless the cloathing Hands does neathly move to adorn and hide their nakedness, with their comely and ministeriall parts of speech" (Chironomia, p. 16 op. cit. Napier, 1980).

IV.6 Summary

Starting with the early patterns of interaction between infant and caregiver, the display of communicative behaviors become more sophisticated and subtle the older we get. Most people are not aware of how and when we use these nonverbal behaviors, or the rules that govern them, as they become an integral part of our communicative system.

As the child grows older, it has been conjectured that he or she will use gestures and body movements to a lesser extent than in infancy and early childhood. These assumptions have derived from case study observations of young children at the age when the children are in the process of acquiring verbal communicative skills. Detailed studies of children's behavior from film and video recordings have shown that the children's use of gestures, body movements and pantomimes does not tend to diminish as the children grow older, rather they become more sophisticated and integrated as part of the children's speech production. At the time when the child is involved in his or her most intensive period of acquiring speech, there might be a latency period for the use of gestures and other bodily means of communication.

In this chapter the importance of visual behavior in interaction and communication and the significance of hand gestures have been especially pointed out, as these are important aspects of the communication system of the deaf.

Gestures with the hands or other parts of the body were by the oralists thought of as a hindrance for language development. The conjectures of Hewes (1978) and of Kendon (1980) among others about a gestural origin of language do not favor such a view.

Today the definition of spoken languages is sometimes expressed as a "vocal-auditive" language, as opposed to sign language that is a "gestural-visual" language (Bergman, 1980).

But visual and gestural means of communication play an important role also in spoken languages, as much research described and discussed in this chapter shows.

Hearing persons when speaking use pointings with the eyes to locate persons or objects, when talking to each other. They use hand gestures when talking, both as accompanying the spoken words but also as semantic modifiers. The raising of the eyebrows or other subtle small movements of the face are used as markers of words and as regulators in the dialogues.

Without these sometimes small nonverbal behaviors the words can become empty, sometimes even loosing their meaning.

V. PROBLEM AND OBJECTIVE

V.1. Historical perspectives

In infancy, the primary caregivers - usually the mother and/or the father - are the infant's most important communication partners. It is in interaction with the caregiver that the child gradually will learn to master "the art of communication" - the complex systems of rules in social interaction.

As the child grows older, other children will have an important role in the child's social development. They usually belong to the first group outside the child's family. In interaction with other children, the child will practice the knowledge acquired during infancy and early in childhood and will gradually learn how social rules and controls work in groups.

During the last decade there has been a growing interest in studies of early patterns of interaction between infant and caregiver. Having access to such technical facilities as film and video, it has been possible to make detailed observations and registrations of both the child's and the caregiver's behaviors, actions and reactions. These microanalytic studies, influenced methodologically by ethology and anthropology, have revealed an amazing communicative ability in infants from the first day of life.

Detailed studies of adults in interpersonal encounters have already revealed that there is a complex pattern of different nonverbal and verbal behaviors in interpersonal communication. However, our knowledge of the development of communication during childhood is rather sparse. There are very few detailed or microanalytic studies of social interaction between adults and children. There is also a lack of detailed studies of communication between children.

During the period from the late 1920s toward the end of the 30s, a number of studies of peer interaction were conducted. Much of current research on child-child interaction is in fact based on methodologies developed during the 30s, as observational techniques, sociograms and experimental intervention.

Renshaw (1981) states that there were three main reasons for the upsurge of interest in children's peer groups during the 30s. The first reason had to do with societal influences. The era around the 1930s was characterized by a financial depression, and political trends such as nazism and fascism. Among many social scientists there was a concern that democratic and social institutions were in danger of failing (Becker et al, 1932; Zorbough, 1938). Adults became unsure of their social values and started to look toward the young for new solutions to the problems of that era.

In 1932, Piaget wrote a paper where he argued for the encouragement of peer interactions in order to ensure truly cooperative and democratic social institutions. He wrote:

> "If we watch the child when he is not with adults ... we will see him develop a social life with other children, and we will notice that while he is developing socially he is also intellectually acquring the power of thought and critisism ...But too often education ends by destroying instead of using and developing the desire to cooperate ... (1932, p. 20).

A second factor to the increasing number of studies in peer interaction in the 30s, was according to Renshaw (1981) an interest in the spontaneous social inclinations of children. He takes an example in Anna Freud (1935) who held the view that young children were inconsiderate, selfcentered and cruel. These traits were regarded as the inevitable outcome of the struggle between the children's spontaneous and selfcentered impulses and the restrictions imposed by the environment. Systematic observations of childrens' peer interactions showed however that children were cooperative, friendly and symphathetic towards other children in peer interactions (Isaacs, 1931; Parten, 1932; Cocknell, 1935; Murphy, 1937).

A third and last reason for the upsurge in studies of peer relations was a factor of a more practical nature. During this time child welfare centers and schools were started in several countries, which enabled young children to be studied in natural groups.

After World War II, research on children's peer relations diminished. One reason was that there was a renewed interest in Freudian theory, stressing the relationship between mother and child. Another reason was that experimental studies in laboratories were advocated, especially by learning theorists as the best context in which to study children and establishing the laws governing human behavior (Skinner, 1947; Keller, 1950).

It was not until the late 1960s and early 1970s that studies of peer interactions became the topic of research again. One of the reasons of the awakening interest in child-child interaction was that ethologists started to make studies of children's behavior (e.g. Blurton Jones, 1971, 1972; McGrew, 1972).

Ethological studies of child-child interactions have primarily focused on children's use of different nonverbal and verbal expressions in various play situations. These studies have not, however, focused on how children communicate, analyzed from a dyadic point of view. There are exceptions, but they are still very few (e.g. Camras, 1977).

When researchers during the 70s started to make observations of child-child interactions, often using film or video equipments, they found that young children are socially oriented and that they can communicate effectively in most situations. Studies of toddlers and infants have shown that even these young children can be observed to seek social interaction with other infants and toddlers (Hay, Pedersen and Nash, 1982; Eckerman and Stein, 1983; Bakeman and Brownlee, 1982).

Garvey and Hogan (1973) made videotape recordings of play sessions of dyads of children in the age-range of three and a half and five years. They found that there was a high level of mutual responsiveness in both speech and behavior. Social speech was defined as speech that was strictly adapted to the speech or behavior of the partner. Each utterance unit was coded according to it's result. They suggest that children in this age are capable of genuinely social behavior and that early forms of social speech entail a surprising level of interpersonal understanding.

Maratsos (1973) administered a simple referential communication task to three to five years old children, where the children could communicate their choice of a toy either to a person who was in view or to one who was not. Maratsos found that the children were able to take into account important aspects of the listener's situation.

The study of child-child interactions and social skills in childhood has during the last years become a field of research with high priority in child development. Many children start preschool activities in day care centers or in nurseries at an early age. They will spend many hours a day together with other children. Thus, detailed studies of child-child interaction are of great importance to our knowledge of the social world of the child.

V.2 The problem and objective of the present study

Each year about one hundred thousand children are born in Sweden. Of these children, about fifty or sixty are born with a severe hearing impairment. Deaf children usually start preschool activities together with other deaf children when they are between three and four years old. As for hearing children, other children will play an important part in the social world of the deaf child.

Our conception of the social life of deaf children has primarily been based on studies of orally trained deaf children - mostly involving assessments according to social maturity scales developed for hearing children. Detailed descriptions and analyses of the social interactions of deaf children have been non-existent. The results of these earlier studies of deaf children's social maturity (for a review see e.g. Meadow, 1980), indicated that the deaf children as a group were aggressive, immature, egocentric and linguistically retarded.

When systematic observations of hearing children in social interactions were conducted, Anna Freud's notion of children - that young children are inconsiderate, selfcentered and cruel - was not confirmed. On the contrary, the studies showed that children are cooperative, friendly and symphathetic towards peers in social interactions. As in the case of hearing children, there is a need for detailed and systematic studies of the way deaf children behave in social interactions in order to give a well-founded picture of social and communicative skills in deaf children.

The importance of studying social interaction in deaf children has also been pointed out by Maestas y Moores and Moores (1980):

> "Now that some of the basic issues in oral and manual communication have been resolved, it is projected that future research will exhibit a pragmatic, ethological orientation with greater emphasis on interactions between child and environment" (p. 49).

The present study is an attempt to shed some light on one part of the social world of the deaf preschool child, as it is shown in the interaction with other deaf children.

The objective of the present research project is to make a descriptive study of communicative strategies used by deaf children in the preschool ages in different social interactions with other deaf children. Registrations of the children's actions and reactions were made by means of video recordings with simultaneous direct observations.

Of special focus will be the children's display of nonverbal behaviors, i.e. gaze, facial expressions, gestures, body movements and body postures, but also their use of verbal behaviors, i.e. signs, finger spelling, articulation and speech.

The children participating in the study had varying experience in sign language communication. This has made it possible to describe communcative strategies used by deaf children with early sign language experience (the ESL children) and communicative strategies used by deaf children with late sign language experience (the LSL children) in child-child interactions.

The study is explorative and descriptive. As in all descriptive studies, there are no hypotheses formulated before starting the work. A review of studies of mother-infant interactions, child-child interactions and also of adults in interpersonal encounters, referred to in Chapter II-IV, has made me concentrate the descriptions on certain aspects of communicative strategies between the children as they are shown in:

- attention to a partner in dialogues and when initiating contact with a partner
- the use of nonverbal and verbal means of communicating in dialogues, when initiating contact with a partner and in joint activites
- modification of communication
- adaptation to a partner in conflict situations

V.3 Methodological problems

A fundamental methodological problem in the study has been how to structure the videorecorded material; how to transcribe the behaviors; how to analyze the flow of communication between children and how to make a description of the interactions.

The first question raised is how to handle the collected material from the video recordings. How to identify behavior units from all information available from videorecorded interactions and how to make objective and systematic transcriptions of what the children do and how they do?

Transcriptions of behavior units is the first step in analyses of children's communication in social interactions. It can be described as a way of taking all pieces of information apart. The next question that is raised concerns how to put all pieces of information back again - how to analyze the flow of communication between the children observed.

The third methodological question in this study is how to re-create the videorecorded interactions for a reader. How to make a description of the interactions that can visualize for a reader in a comprehensible way, what has happened in a group of children?

VI. METHODOLOGICAL CONSIDERATIONS

Two basic research approaches have been employed in studies of nonverbal behaviors in interpersonal interactions.

The first, and most commonly used in the early stages of this research, was an experimental approach. The predessesors of the experimental approach of studies of nonverbal behaviors have usually not been interested in the communication process per se, rather in the relationships between nonverbal behaviors and inner-feeling states (e.g. Ekman and Friesen, 1975), or between nonverbal behaviors and environmental variables (e.g. Mehrabian, 1972).

The second approach, most commonly used especially in mother-infant and in child-child studies, has been the use of observational methods. Ethological observational techniques have had the greatest impact on the study of nonverbal behaviors.

VI.1 Ethological research

One characteristic of ethological research is detailed observations of animal or human behavior in natural settings, without interference from the observer*. The behaviors observed are described as far as possible in noninferential and nonevaluative terms.

*)For a detailed overview of theories and methods of ethology the following authors are recommended: Blurton Jones (1972), Brannigan and Humphries (1972), Bateson and Hinde (1976), Hansson (1978).

Ethology has grown from the traditional discipline of zoology. A major feature of the zoological approach to behavior, is the division made by Tinbergen (1951) of questions about behavior into four different categories. When asking why an animal's behaves in a certain way, Tinbergen argues that four different things are meant by "why":

1. What is the immediate causal control of this behavior?
2. How did this individual grow up to be an animal who responds that way? I.e. questions about development and learning.
3. What use is this behavior to the animal? I.e. the survival value for this behavior.
4. Why does this kind of animal solve this problem of survival in this particular way? I.e. a reflection of the evolutionary origins of this particular kind of animal.

The ethological research approach was essentially formulated by Darwin (1872). Darwin described different emotional expressions and considered their evolutionary origin in relation to current physiological and anatomical knowledge. Darwin paid much attention to the description of the forms of the expressions themselves, which is a central part of the ethological approach. Subsequent psychological studies of emotional experience did not follow this research approach, but rather concentrated on the judgement of "meaning".

During the last years ethologists have started to study child-child interactions as well as mother-child interaction (e.g. Blurton Jones, 1972; McGrew, 1972; Leach, 1972; Richards and Bernal, 1972; Montagner, 1978).

Some of these researchers, particularly Blurton Jones (1972) and McGrew (1972), have criticized the traditional research in child development, and especially the observational techniques used. McGrew (1972) states that when developmental psychologists describe behavior, they use categories of behavior that either are very general or inferential, for example,"aggression",

"anxiety", "dominance" or "positive social behavior". According to an ethological standpoint the meaning of the behavior is something to be discovered, not something to be assumed.

Ethological research is time-consuming. But it has yielded information that could hardly be explored using an experimental approach. Tinbergen (1963) states that observations in natural situations do not exclude the use of controlled studies, experiments or laboratory studies of topics of special interest. However, knowledge based on detailed descriptions of events is an essential foundation for later experimental studies.

> "In order to explain any phenomenon it is first necessary to describe it thoroughly, accurately and objectively" (Brannigan and Humphries, 1972, p. 41).

Knowledge about the context is of crucial importance in understanding and interpreting human behavior. Shotter (1978) discusses theoretical considerations in studies of human behavior, particularly in early infant development. He states that:

> " ... one cannot find the sense in a person's actions just by looking at the logical structure of the movements in which it consists: one must study how these movements are put to use in a social context" (p. 46).

Bateson and Hinde (1976) stress the importance of contextual analyses of the data in ethological research:

> "...ethological descriptions of human behavior are not likely to be of much value if they disregard context and meaning" (p. 425).

Ethological research has been criticized. Callan (1970) talks about "ethologism" as a label for the new wave of popular descriptions, represented by Morris (1967, 1969) and Ardrey (1967). Freedman (1975) has criticized these authors and also those works of Lorenz (e.g. 1966), where he draws far reaching parallels between animal and human behavior.

Data from other species than humans can give rise to valuable ideas and hypotheses about human behavior in different social settings. But before there are data about how humans react in situations like those where animals have been studied, these hypotheses remain only pure guesses about human behavior.

VI.2 Collection of data - single versus repeated registrations

Registrations of children's behaviors in child-child interaction from a single or from a limited set of occasions make it difficult to know how stable the patterns of communication are which are being observed. The period of observation can in one or several respects be unlike other time periods. Repeated measures over a period of time are necessary in order to prevent from observing incidental interactions.

A question that is raised when making observations of the children in natural settings concerns the sampling of interactions to be observed during each visit to a child group. A time sample technique can be used with registrations of the peer interaction e.g. every minute with one minutes pauses. Smith and Connolly (1972) and Blurton Jones (1972) for example used 5 minutes samples in their studies of child-child interaction. Such fixed time tables can be appropriate when studying the children's display of behaviors in free play, but can not be considered so, when studying communicative strategies used by children in social interactions. When studying communicative strategies some of the important phases in an interaction is how an interaction starts and how it comes to an end.

VI.3 Transcription of behavior - levels of description

Our experience of other person's behaviors and actions is discrete, rather than continuous. We perceive persons perform a series of discrete actions rather than seeing continous

undifferentiated behaviors (Barker, 1958, From, 1971). These discrete actions constitute a series of units in the stream of information presented by ongoing behavior (Newston, 1976). Persons differ as to how they identify breakpoints between units of behaviors in a given sequence. This difference can be due to differing levels of analyses that subjects adopt for identifying sequences. The levels of analyses that subjects use can be influenced by prior information as to which level to adopt (Newston, 1976).

The researcher's dilemma is to find a level where it is possible to make enough detailed descriptions of what is going on, without being too thorough, getting lost in all the details. Methods of observation most frequently used in nurseries or kindergartens usually involve crude categories of descriptions (Rönnberg, 1970; Gordon and Jester 1973; Arvidsson, 1974; Brenner et al, 1974). The common purpose of these observations has been to give a description of an individual child in terms of status in a group, or to observe certain aspects of the child's development.

Results from studies of interaction between deaf children, between hearing impaired children and between hearing children, and interactions between these groups have been reported in some articles published in the American Annals of the Deaf and the Volta Review.

Bracket and Hennigen (1976) used three communication categories in their description of children's interaction: speech, vocal and gesture. A differentation of "gestures" was not made, nor were other behaviors such as visual behaviors or body movements included. It must be considered highly questionable to give a description of children's communicative behavior in only these three categories used.

Very small, at first sight meaningless behaviors, can sometimes play a very important part in explaining what has happened in an interaction. These types of behaviors are not included in ordinary methods of observations because they are often not even noticed. It is almost impossible to register small behaviors like gazes, smiles, vocalizations or a change in body posture while observing the interaction in a group of children. Video or film are necessary research tools for such kinds of studies.

VII. METHOD

VII.1 Subjects

Collection of data started in January 1978. At this time, most of the deaf children at the kindergarten where this research has been conducted, had not had access to sign language until starting preschool activities, at the age of between three and four years.

As this study progressed and attitudes to sign language communication gradually changed in society, other children came to the kindergarten. For several of these younger children, sign language had been introduced at an earlier age, at around the age when they were one year old.These younger children with early language experience starting preschool activities between late 1978 and 1980 were recruited to this study as well.

The children went to the kindergarten in small groups in charge of specially trained preschool teachers. The groups were placed in a kindergarten for hearing children. Part of the time they joined in the activities of the hearing children.

Six boys and nine girls born between 1971 and 1977 have been observed. The children have not been specially selected to participate in the study: children that were in the kindergarten at the time of the video recordings have been observed. The age and sex of the children at the time of the first video observation is presented in table 1. In table 2 and 3 the etiology and the degree of the hearing impairment are presented.

When the study began in 1978, eleven deaf and hearing impaired children were observed. After one semester some of the older children started school while younger children entered the kindergarten. The total time period that each individual child was observed, varied between one and four semesters.

One child, aged 3:5 when the data-collection started, has participated in the study during four semesters - two years. Seven children have participated during three semesters - one and a half year. Six children have participated during two semesters and one during one semester, before starting school.

Table 1. The age and sex of the children at the time of the first video observation.

	The ESL children		The LSL children		Total
	Girls	Boys	Girls	Boys	
Between 3 and 4 years	3	-	2	-	5
Between 4 and 5 -"-	1	1	-	-	2
Between 5 and 6 -"-	-	-	1	1	2
Between 6 and 7 -"-	-	-	2	4	6
	4	1	5	5	15

Table 2. The etiology of the hearing impairment.

	The ESL children	The LSL children	Total
Cytomegalovirus infection in the mother during pregnancy	-	2	2
Premature birth	-	2	2
Rubella infection in the mother during pregnancy	1	1	2
Meningitis	-	1	1
Unknown or uncertain etiology	4	4	8
	5	10	15

Table 3. Degree of hearing impairment (estimated as the mean value for the "best" ear over 5 frequencies (250-4.000 Hz) in reaction to sounds of different intensities, db).

	The ESL children	The LSL children	Total
60 - 80 db (hard of hearing)	-	2	2
81 - 90 db (severly hearing impaired)	-	2	2
91 - 100 db(profoundly hearing impaired)	1	1	2
100 db - (total deafness)	4	5	9
	5	10	15

The children in the research groups all used sign language, although the dependency on a visual-manual code differed somewhat for different children. (In the description of each individual child, this will be described in more detail.)

The teachers used signs and speech simultaneously when communicating with the children. Gestures, pantomime, written words and pictures were also part of the communication between teachers and children.

In the early parental guidance, all of the parents of the children participating in this study were given the advice to primarily use speech and hearing in communicating with their child.

As the speech and hearing training did not give any substantial results, sign language was introduced for ten of the children at about the time of entering preschool activities (the LSL children). For five children the parents decided to start with signs in communication at an earlier age, when the children were between one and just above two years of age (the ESL children). In table 4, the age when sign language was introduced is presented.

The parents of the children in the research groups were hearing. They used signs and speech simultaneously as well as natural gestures and pantomime.

Table 4. Age when sign language was introduced.

	The ESL children	The LSL children	Total
Around 1 year of age	2	-	2
Between 1 and 2 years of age	2	-	2
Between 2 and 3 years of age	1	-	1
Between 3 and 4 years of age	-	2	2
Between 4 and 5 years of age	-	3	3
Between 5 and 6 years of age	-	5	5
Total	5	10	15

Most of the children in this study also participate in an ongoing longitudinal study of "Learning processes and personality development in deaf children" (Nordén, Preisler and Heiling, 1979; Preisler, 1979; Nordén, 1981; Nordén and Preisler, 1982), which started in 1977.

Direct observations of the deaf children in combination with video recordings have been made once a month during semesters, in preschool and later in school activities.

The subjects in the study of "Learning processes and personality development in deaf children" are 20 prelingually deaf children born between 1970 and 1974, comprising all children in these ages from the southmost County Council in Sweden who were supposed to be placed at the school for the deaf children during their school years.

Additional six children with early sign language experience have been selected to participate in the longitudinal research project. These children were born between 1975 and 1980 (Nordén, 1981; Preisler, 1981; Nordén and Tvingstedt, 1982; Hülphers, in press).

The groups of deaf children in the study of interaction between deaf children and in the longitudinal study of learning processes and personal development are not entirely identical. When the study of interaction between deaf children began some of the oldest children participating in the longitudinal study had already started school. Younger children born after 1974 started preschool activities and in addition a couple of children moved in from other areas and were placed in the kindergarten.

As most of the children in the study presented here, also participate in a longitudinal study of learning processes and personality development there is a large amount of data collected on these children. All this information has been available for the present study which has been very valuable when interpreting and understanding the way the children interacted with other children.

During each visit to the kindergarten, the research team discussed the children participating in the study with the staff. In this way the research team was kept continually informed about the situation for each individual child as well as for the group as a whole.

The parents used to come to the kindergarten regularly to meet the staff as well as the other children's parents. During the meetings video recordings of the children were shown several times. This was also an opportunity for the research team to meet and talk to the parents of the participating children.

VII.2 Procedure

In the study to be presented an ethological research approach has been used. The deaf children have been observed in natural settings in their kindergarten. Transcription of the children's nonverbal and verbal behaviors have been made, using behavior units as free from evaluations and interpretations as possible (see section VII.4.1).

The deaf children have been studied via video recordings with simultaneous direct observations once a month during preschool semesters. Between eight and nine observations were made during a year.

Direct observations by trained observers have been made during, before and after each video recording session. These observations included subjective descriptions of the situation as a whole and of individual children's behavior that particular day. Information considered valuable and important in understanding individual children's behaviors has also been noted in these direct observations.

The use of direct observations is a necessary complement to video recordings. The two-dimensional picture contains less information than the three-dimensional reality. The angle of the camera is narrow and cannot register what is happening just outside that angle.

Direct observations are further needed to give information about the context in which the children are interacting. Without knowledge of the context it is impossible to understand and interpret the cause of a certain action (Bateson and Hinde, 1976; Shotter, 1978; Bullowa, 1979; and Foster and Brandes, 1980).

Observing in natural settings, without any interference of the researcher, is a characteristic of ethological methodology. During the video recordings the research group consisted of two

or three persons. These people, including camera and other technical equipment, cannot pass unnoticed in a small kindergarten. To counteract attention to the research team, frequent appearancies in between recording sessions were made. In this way children and staff became used to the presence of the researchers. Several observations during the study disclosed that the presence of observers and equipment after a few sessions became more or less a matter of course. Both children and teachers lost interest and seemed to be unaware of being observed and recorded.

VII.3 Collection and selection of data

Video recordings of the preschool children have been made in collaboration with the longitudinal study of learning processes and personality development in deaf children (Nordén, Preisler and Heiling, 1979; Nordén, 1981).

In order to collect data for both these studies, the children were observed and video recordings were being taken in various natural settings in the kindergarten:

- when they have been working with their teacher practicing writing and reading
- when they have been playing or working together with hearing children
- when they have been engaged in free play activities with other deaf children

During each visit to the child groups one or two videotapes were taken. The tapes have a running time of thirty minutes. During some visits the chidren were taking part in activities with the hearing children and/or in activitities with their teachers. Therefore child-child interactions were not possible to video-record during each visit.

For the purpose of the study of social interaction between deaf children, only those video recordings where the children have been in interaction with other deaf children have been selected.

When the children have been videorecorded when playing with other children and the teacher has actively taken part in the children's activities, the tapes have not been used for further analyses in this study.

This was the first selection of the data to be analyzed. From video recordings with child-child interaction a second selection of the material was made. This selection concerned the possibility to analyze the videorecorded interaction. In some instances there were technical deficiencies in the videorecorded material that made detailed analyses impossible. In other instances the children were playing in a large play room at the kindergarten, which made it difficult for the researcher behind the video camera to focus on more than one child at a time. As the purpose of this study was to describe interactions between two or several children, it was not possible to analyze those interactions.

A third selection of the material was made in order to find complete interactions between deaf children including both a start and an end to the interactional sequence.

A start of an interaction was defined as a situation when the children started a mutual activity. An end of an interaction was defined as when an ongoing activity ended: the children could be leaving the place where they had been playing, or leaving the room. In some instances hearing children entered the deaf children's play, giving raise to a new type of interaction, beyond the purpose of this study.

When interactions on video recordings taken close in time within the same groups of children were judged by the research team as very similar both with respect to content and to type of activities, only one of the interactions was selected for further analyses.

In all 32 interactions were selected for analyses. The interactions lasted between 1.15 minutes and 8.0 minutes, summing up to 2 hours 28 minutes and 40 seconds of videorecorded material.

When analyses started with transcriptions of the children's behaviors, it was found that in some play activities, where a teacher was present, she had a more active role in the play of the children than at first observed. Those video recordings were also excluded from further analyses.

The remaining videorecorded material, in all 25 different play sessions lasting 1 hour, 42 minutes and 15 seconds, were analyzed. These 25 play sessions lasted between 1.15 and 7.20 minutes with a median duration of 3.25 minutes. In Appendix 1, the 25 interactions will be described, giving both a description of the type of interaction, and the names and ages of the children taking part.

The interactions selected for analyses have been thoroughly discussed by the author with the researchers of the study of "Learning processes and personality development" so as to assure that the interactions could be considered representative of the children observed at the time when the video recording was made. The selections of the interactions were finally made when the children had been observed and videorecorded for a period of between one and two years. Thus, there was a substantial set of data available for the children participating in the study. This information made us agree that the interactions selected could be considered representative of the children when in the preschool setting.

VII.4 Analyses

Analyses of detailed observations of nonverbal and verbal behaviors in interpersonal interactions can be made,using a variety of methods of analyses. Some researchers, working with descriptions of children's behaviors in child-child interactions, have chosen to count frequencies of occurrence, mean values and standard deviations of the appearance of specific behavior units (e.g. McGrew, 1972; Smith and Connolly, 1972). The mentioned methods of analyses give valuable information of e.g. how often a specific behavior appears during a certain period of time or in a certain context of events. The weakness of these methods of analyses is, to my opinion, that they do not have the power of describing the dynamics of the communication process.

Factoranalyses and univariate analyses of variance are other methods of processing data on child-child interaction, that have been employed by among others Blurton Jones, (1972) and Gutmann and Turnure (1979).

In some studies on mother-infant and child-child interaction, computation of conditional probabilities have been used in analyzing data (Lytton and Zwirner, 1975; Patterson, 1975; Leach, 1972; Magnuson, 1979). A data program, PRIMATE, has been constructed by Humphries (1974) and was designed to be used

> "...in observation and analyses of child behavior, animal behavior or any situation in which there are a number of animals, people or things performing actions sequentially under various conditions and interacting with each other in all kinds of ways" (p.1.1).

PRIMATE can be used to calculate probabilities of occurrence of one behavior happening at the same time as another behavior (but only for one individual) or before or after another behavior (for one as well as two or more individuals).

Clusters of behaviors with high probabilities of occurring together can be calculated and dataprocessing is made sequentially.

There is a severe limitation with the program however, as it cannot take into account that two or more children behave or act at the same point in time, which they certainly do.

Some of the data from the present study were processed by the data program PRIMATE. Transcriptions of behaviors of two girls sitting opposite each other drawing, were analyzed. (This interaction is presented in section VIII.2.1).

The result of the analyses did not add any new information relevant to the goals of this study. Rather, information was obscured since clusters of behaviors with high probabilities of occurring at the same time, before or after another behavior made little or no sense. Calculations of probabilities could not show the flow of interaction between the children: how they moved in synchrony, how they waited for their turns, how they smiled and watched each other as they worked, as was revealed in the detailed observations and transcriptions of the children's behaviors from the videotapes.

The weakness of the above mentioned methods of analysis are that they do not adequately take into account one or several of the following aspects:

a) the temporal aspects of interaction and communication
b) the context in which different behaviors occur
c) that communication is a mutual process between two or more participants, i.e. that an individual is both receiver and sender at the same time in interpersonal communication.

In the present study, an adaptation of a model of describing mother-infant interaction in different phases used by Tronick, Als and Brazelton (1980) has been used in describing the interactions between the deaf children.

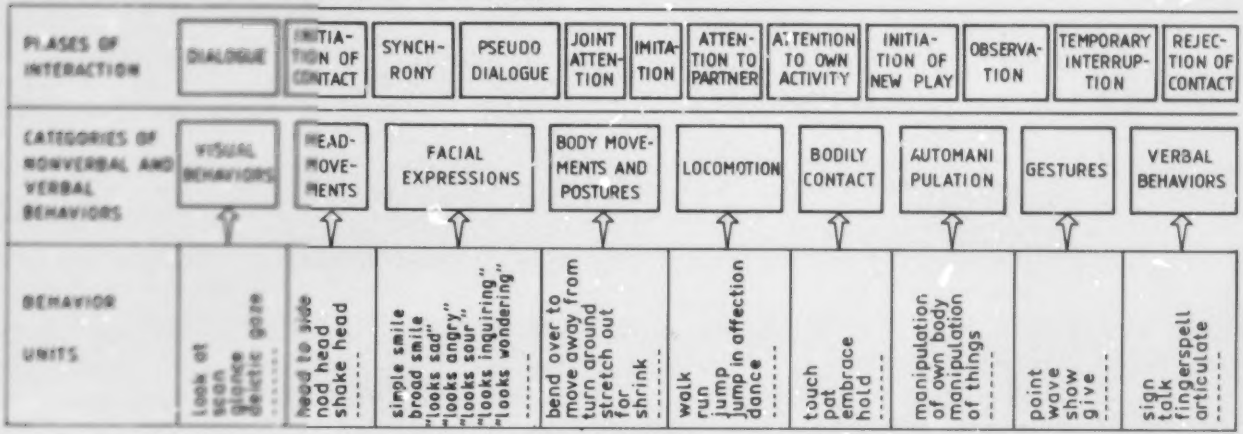
Tronick, Als and Brazelton (1980) analyzed the development of different forms of intended behaviors of the infant in a study of infant's communicative competencies and the achievement of intersubjectivity. In the study, the researchers described the full range of infant and adult behavior with analyses of the dynamic relations between the infant's and the adults' behavior.

Their system of describing interaction involves three steps, the first is to videotape a period of face-to-face interaction between an infant and an adult. The second step is to categorize each expressive behavior of the participants on a second-by-second basis from the videotape. The third step, finally, is to transform the combinations of expressive behaviors into Monadic phases. These phases are considered to be the structural units of the interaction and analysis of the interaction is carried out on them.

The first step in analyzing the videorecorded interactions between the deaf children was to identify behaviors and expressions to be transcribed. Through repeated observations of videorecorded interactions, a list of behavior units was constructed. From these detailed transcriptions, different phases of interaction were identified. The next step in analyzing the interactions was to transform combinations of nonverbal and verbal behaviors displayed by pairs of children into different interactional phases. These phases of interaction have been the structural unit of the interaction and analyses of the interactions have been carried out on them.

Figure 1 is an illustration of the levels of analyses used in this study.

Figure 1. Schematic illustration of analyses used in the study.



VII.4.1 Transcription of behavior units

The first step in analyzing the videorecorded interactions, was to identify behavior units to be transcribed. Through repeated observations of videorecorded interactions, a list of behavior units was constructed. The final list included behaviors identified in the present study, in earlier studies of deaf children ininteraction (Preisler, 1979; Preisler, Blohm and Hanson, 1982), but also in descriptions of hearing children in interaction (Preisler, Blohm and Hanson, 1982). Studies of language development in deaf children and studies in mother-infant interaction have also influenced the definitions of behavior units in the present study (e.g. Goldin-Meadow and Feldman, 1975; Hansen and Kjaer-Sörensen, 1976; Schlesinger and Meadow, 1972; Ahlgren, 1980a, 1980b; Trevarthen, 1977; Collis, 1979; Tronick, Als and Brazelton, 1980) as well as ethological studies of child-child interaction (e.g. Blurton Jones, 1972; McGrew 1972; Hutt and Hutt, 1970).

The units chosen have been compared to, and in some cases redefined and adapted to,units of behavior used by other researchers in the field in order to make comparisons possible (Grant, 1969; Hutt and Hutt, 1970; Smith and Connolly, 1972; McGrew, 1972; Blurton Jones, 1972; Leach, 1972; Montagner, 1978).

The behavior units have been grouped according to part of the face or body involved and are the following:

- Visual behavior
- Head movement
- Facial expression
- Body movements/body posture

- Locomotion
- Bodily contact
- Auto manipulation
- Hand/arm gesture
- Verbal behavior
- Other audible expressions

In order to make a time analysis of the children's behavior in greater detail, an electronic time device was copied on the video-tape. The time device had a capacity of registering 1/100 of a second, but a second-by-second analysis has been chosen. This was more apt to the capacity of the video recorder to reproduce clear pictures.

The complete list of the units of behavior summing up to 108, is presented in Appendix 2. An example of a transcribed 30 second period of interaction will be given in Appendix 3.

VII.4.1.1 Interjudgment agreement

The children's behaviors were transcribed by two trained observers*. One of the observers transcribed about two thirds of the data while the other transcribed the remaining one third.

In order to calculate interjudgment agreements of the definitions of the behavior units, a third trained observer** transcribed about ten percent of the total amount of transcribed video recordings.

*) The first observer was the author. The second observer had a Bachelor degree in psychology, had been working as a teacher of deaf children and had experience of child observations. He also had good command of sign language.

**) The third observer was social worker at one of the schools for the deaf, with many years of experience of deaf children. She had earlier experience of child observations and also a good command of sign language.

Comparisons have been made for three different observers' transcription of the nonverbal and verbal behavior.

Interjudgment agreement has been calculated, using the formula

$$\frac{\text{Amount of agreement}}{\text{Amount of agreement + amount of disagreement}}$$

Interjudgement agreement, corrected for one second time delay was .93. The interjudgement agreement was .94 for the first pair of observers and .91, for the second pair of observers.

Calculations were made for different behavior units grouped according to behavior category as well as taking context into account. If the child was engaged in play situations where he or she was seated most of the time, this was labelled situation 1. If the child was involved in free play activities in a large area in the play room, this was labelled situation 2. Table 5, 6 and 7 give information of interjudgement agreements between the observers.

Table 5. Total interjudgment agreement for different body parts and two situations.

	Situation 1	Situation 2
Visual behavior	.86	.81
Head movement	.94	.95
Facial expression	.91	.91
Body movement/posture	.91	.93
Locomotion	1.00	.89
Bodily contact	1.00	.90
Self adaption	.96	.97
Hand-arm gesture	.96	.93

Table 6. Interjudgment agreement between observer 1 and observer 3.

	Situation 1	Situation 2
Visual behavior	.86	.83
Head movements	.93	.99
Facial expression	.90	.97
Body movement/posture	.91	.97
Locomotion	1.00	.94
Bodily contact	1.00	.99
Self adaption	.97	1.00
Hand-arm gesture	.96	.96

Table 7. Interjudgment agreement between observer 2 and observer 3.

	Situation 1	Situation 2
Visual behavior	.88	.80
Head movement	.97	.94
Facial expression	.92	.88
Body movement/posture	.90	.90
Locomotion	.99	.86
Bodily contact	1.00	.87
Self adaption	.89	.95
Hand-arm gesture	.97	.90

Visual behaviors received the lowest interjudgment agreements, especially during free play. This can be explained as due to the difficulty of registering exactly where the child is looking when not in full face picture.

The deaf children's sign language was transcribed by a deaf member of the research team. She registered individual signs. Translation of the signs, taking into account the context and the bodily expressions accompanying the signs, was then made by the author and the deaf researcher. If there were doubts about what the children were signing, different members of the research team were engaged in solving the problem. In some cases, the teacher or the parents have been asked to check up our registrations or to help in transcriptions so as to get the children's signs as correctly transcribed and translated as possible.

Interjudgement agreements have not been calculated on these translations.

The children's use of articulation, vocalizations and of speech sounds has only been transcribed by the author or by one of the members of the research team. It turned out to be almost impossible to know exactly who produced what sound, if the researcher did not know the child or had not been participating in the video recordings.

Similar observations have been made from a parallel study of hearing children in interaction (Blohm, under preparation)*. Again it was not possible for someone not knowing the hearing children or participating in the video recordings, to judge which child produced what words or what sounds, when the children were not in full face picture.

VII.4.2 Phases of interaction

From the detailed transcriptions of the nonverbal and verbal behaviors of the deaf children, different phases of interaction were identified. Classification of the interactions into phases can be regarded as one way to structure the collected material. The content in each phase and the communicative strategies used by the children, will be described in the results.

Each child's actions and reactions in relation to a partner's actions and reactions were taken into account when determining the phases of interaction. The phases identified were the following:

*) This study will be discussed further in section VIII.4.

a. Dialogue

To be characterized as a dialogue(defined as "the interchange and discussion of ideas" in Webster Oxford Dictionnary, 1977, p. 503), one of the children in the pair must be judged to transmit a message, verbally and/or nonverbally to the partner, who in turn responds to this message, verbally and/or nonverbally. A dialogue involves an encoding and a decoding process. The receiver (decoder) must in noticable ways express that the message is received and understood if the behaviors are to be judged as belonging to a dialogue. An expression or a behavior that might not have been intended to become part of a dialogue, but is received and replied to by the partner, can also be part of a dialogue.

b. Initiation of contact

The child approaches a partner by means of verbal and/or non-verbal behaviors and the child is judged to have the intention of initiating contact with the partner.

c. Synchrony in body movements

The children move in synchrony with each other's movements. There is usually no mutual gaze. The synchrony of movements registred does not contain synchrony in movements during dialogues. When the children have been in conversation, only the phase "dialogue" has been used.

d. Pseudo dialogue

The child is acting as if involved in a dialogue, but there is no mutual understanding between the child and the partner.

e. Joint attention

The child and the partner are in joint attention towards a third person or in joint attention towards an event happening outside the play area.

f. Imitation

The child imitates or makes the same movements or actions as the partner.

g. Attention to partner/joint activity

The child is watching and/or using nonverbal or verbal expressions directed towards the partner, without there being a dialogue between the children. If both the child and the partner are directing their attention to one another,watching and/or using nonverbal or verbal expressions directed to partner, the term "joint activity" will be used in the descriptions of the interactions.

h. Attention to own activity

The child is busy with his/her own activity without watching and/or signing/talking to the partner.

i. Initiation of new play

The child initiates a new play and the partner follows. The child does not, in any noticable ways, make any contact initiative to the partner.

j. Observation

The child is watching the partner's activity or play but is not participating in any mutual activity with the partner.

k. Temporary interruption in the interaction

The child leaves the room temporarly to fetch something, as a part of the ongoing activity.

l. Rejection of contact

The child rejects contact from the partner. This rejection can be verbal and/or nonverbal.

The twelve different phases have been scored second-by-second and can be illustrated in a phase-flow diagram. The two diagrams, figure 2 and 3, show two different patterns of interaction. The first example, figure 2, is taken from an observation of two deaf children with early sign language experience. The children are 4:4 and 5:5 years old respectively. (This observation will be described and discussed in section VIII.2.4.) The second example in figure 3 shows a pattern of interaction between two children not sharing a linguistic code. (This observation will be described and discussed in section VIII.3.5.)

Figure 2. A phase-flow diagram of an interaction between two deaf children with early sign language experience (Interaction no. 21).

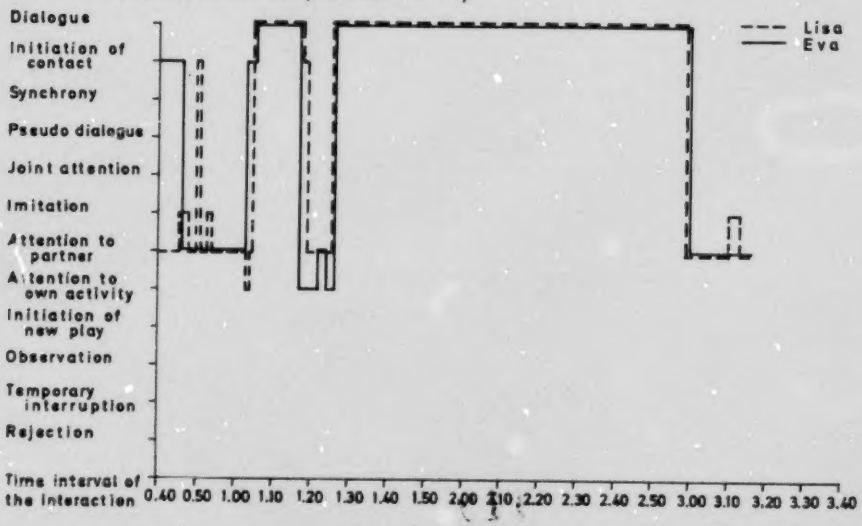
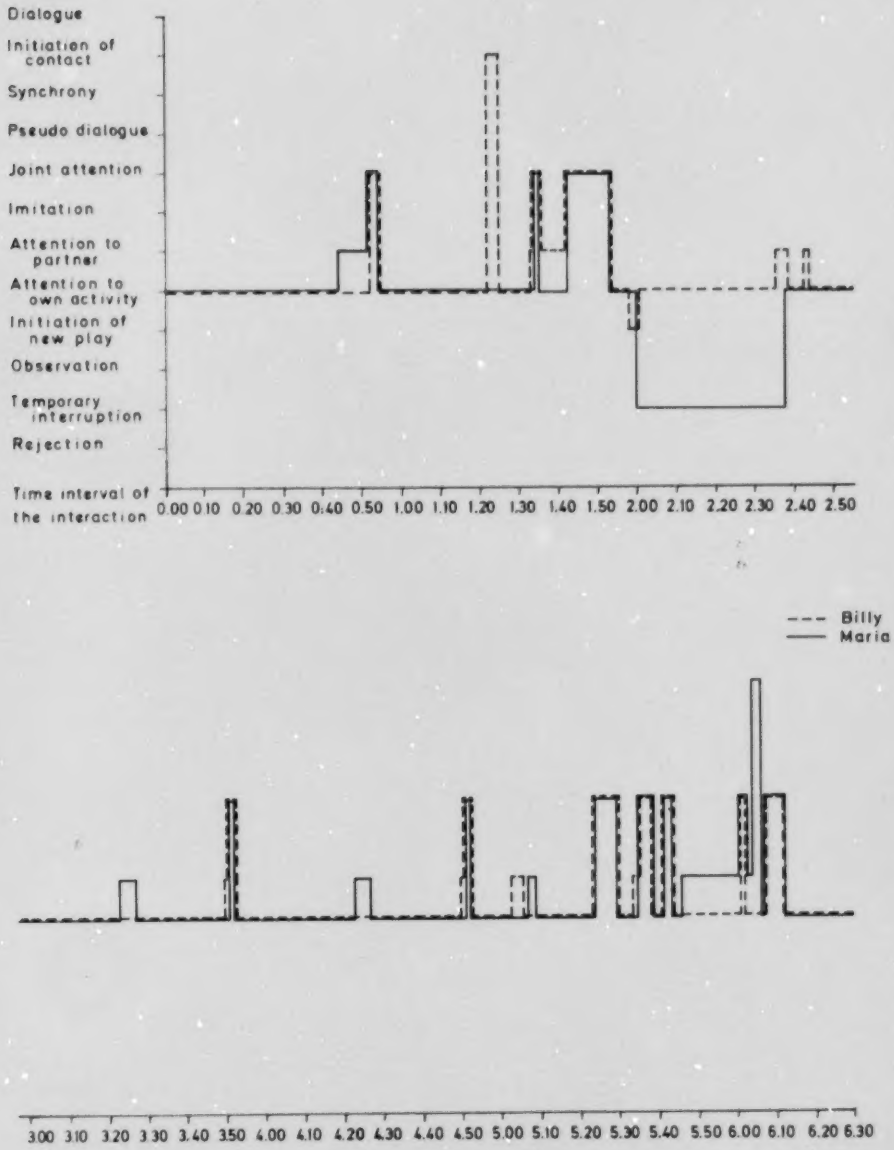


Figure 3. A phase-flow diagram of an interaction between two children not sharing a linguistic code (Interaction no. 19).


Dialogue
Initiation of contact
Synchrony
Pseudo dialogue
Joint attention
Imitation
Attention to partner
Attention to own activity
Initiation of new play
Observation
Temporary interruption
Rejection
Time interval of the interaction
0.00 0.10 0.20 0.30 0.40 0.50 1.00 1.10 1.20 1.30 1.40 1.50 2.00 2.10 2.20 2.30 2.40 2.50
--- Billy
—— Maria
3.00 3.10 3.20 3.30 3.40 3.50 4.00 4.10 4.20 4.30 4.40 4.50 5.00 5.10 5.20 5.30 5.40 5.50 6.00 6.10 6.20 6.30

VII.4.2.1 Interjudgment agreement

Interjudgment agreement has been calculated for the phases of interaction based on judgements from two independent, trained judgers*.

Phases of interaction were scored for 4 of the 25 transcribed interactions. Both ESL and LSL children were participating in these interactions.

Comparisons were made, second by second, of phases of interaction for each child in the interaction, using the formula:

$$\frac{\text{Amount of agreement}}{\text{Amount of agreement} + \text{Amount of disagreement}}$$

The overall interjudment agreement, corrected for one second time delay, was .93. The interjudgment agreements for the four interactions, with 8 observed children, ranged between .88 and .98.

*) The author of this report and psychologist Ulla Blohm.

VIII. RESULTS

Descriptions of the deaf children's communicative strategies in different settings are based on detailed registrations of the children's nonverbal and verbal behaviors transformed into different phases of interaction.

In the first part of the results, the children's display of nonverbal and verbal behaviors in the phases of interaction will be presented.

In the second part of the results, verbal descriptions of communicative strategies used by the deaf children with early sign language experience and by the deaf children with late sign language experience, respectively, will be given. Twenty-five interactions were analyzed. Nineteen of these will be presented in a verbal description. The remaining six interactions showed almost identical patterns of interaction between the children as other interactions described and were not considered to add any new information to the reader. Five of these interactions were between ESL and LSL children (interactions no 8, 11, 12, 14, 15*). One interaction was between two LSL boys (interaction no 13).

In the descriptions of the individual children, the children's real names will not be used, in order to protect their identity.

*) One of the mixed group interaction, no 11, is described in the first part of the results, concerning the content in the phases of interaction.

VIII.1 The deaf children's display of nonverbal and verbal behavior in the phases of interaction

VIII.1.1 Dialogues

In the twenty-five analyzed interactions, 61 dialogues were registered. In interactions between deaf children with early sign language experience, 25 dialogues lasting between 3 and 94 seconds with a median duration of 7-8 seconds*, were registered.

The same number of dialogues, 25, were registered between the LSL children These dialogues lasted between 2 and 26 seconds, with a median duration of 3-4 seconds. In mixed groups finally, i.e. in interactions between a child with early sign language and a child with late sign language experience, 11 dialogues were found, lasting between 2 and 18 seconds with a median duration of 5-6 seconds.

In table 8, the frequency of occurrence of dialogues between the children is reported, including the duration of the dialogues.

The median duration of the dialogues was shortest for the deaf children with late sign language experience - between 3 and 4 seconds. The median duration of the dialogues between the deaf children with early sign language experience was between 7 and 8 seconds. Also in this group, the longest conversations were registered, lasting more than one and a half minute.

There were two dialogues between the deaf children with late sign language that lasted 19 and 26 seconds respectively. In these instances one child was trying to convince the partner of something and comprised only one turn.

*) The dialogues have been scored in one-second intervals and have not been more exactly timed. Therefore the median time values are presented in seconds without decimals.

Table 8. The frequency of occurrence of dialogues.

	Duration in seconds								Total number of dialogues
	0-4	5-8	9-12	13-16	17-20	21-24	25-30	31-	
Between pairs of ESL children	4	10	3	3	2	-	1	2	25
Between pairs of children, one an ESL, the other a LSL child	5	3	2	-	1	-	-	-	11
Between pairs of LSL children	15	5	3	-	1	-	1	-	25
TOTAL	24	18	8	3	4	-	2	2	61

A closer look at the analyzed interactions show that in 10 play sessions, 4 between children with late sign language experience and 6 between children in mixed groups there were no dialogues registered between the children.

In 6 of these 10 interactions, the children were involved in free play activities, as running around, wrestlings and other activities on a large area. In the remaining 4 interactions, the children were drawing, painting or in other ways working with their hands.

VIII.1.1.1 The structure of the dialogues

The analyses of the dialogues of the deaf children with early sign language experience showed that from about four years of age these children had a rich vocabulary of signs. They signed in whole sentences with nouns, verbs, adjectives, prepositions and linkage words like "and" and "but". Many of the dialogues consisted of several turns, i.e. one child started to sign about an event, the partner answered and the child continued or answered the partner's comment and so forth. The dialogues between these children became more elaborated and complex the older the children were.

Examples of dialogues between deaf children with early sign language experience will be given in section VIII.2.

The analyses of the dialogues between the deaf children with late sign language experience showed that their dialogues were simple in linguistic structure. They were characterized by one child making a comment and the partner giving a "yes" or a "no" answer to that comment. In those cases where there were more than one turn, the dialogues consisted of a comment from one child, an answer to that comment from the partner and a confirmation from the first child that the comment had been answered.

Examples of dialogues between deaf children with late sign language experience, will be presented in section VIII.3.

VIII.1.1.2 The content of the dialogues

The content in almost every analyzed dialogue concerned the ongoing play; the "here and now". The only children that discussed matters concerning the future or the past were the young children with early sign language experience. In one instance a child with late sign language experience was observed telling the partner, in signs, about something that had happened at an earlier point in time, but was not understood by the partner.

The deaf children with early sign language experience could be observed engaged in fantasy plays or in role plays, discussing the ongoing play with the partner as what had happened before or what was going to happen next in the play.

Of the 25 dialogues registered between the ESL children, 24 were performed primarily by verbal means. One dialogue, between two girls, 3:2 and 4:3 years old, consisted only of nonverbal means of communication -of actions. These dialogues can be defined as "acted conversations". According to Piaget (1959) "acted conversation" is explained:

> "...as when the collaboration or argument is accompanied by gestures by demonstrations with the finger and not with words..." (p. 77).

Of the remaining 24 verbal dialogues, 17 were conversations where the children exchanged thoughts. Piaget (1959) labels dialogues where the children are exchanging thoughts "adapted information":

> "...either by telling his hearer something that will interest him and influence his actions or by an actual interchange of ideas by argument" (p. 10).

Five of the dialogues were characterized by questions and answers, while one dialogue did not easily fit into Piagets' definitions concerning children's conversations. One child made the comment "ELLEN THINKS YOU ARE STUPID", but the partner did

not agree upon this statement and answered "NO WRONG"*. This dialogue might be defined as "criticism", using Piaget's definition.

Eleven dialogues between pairs of ESL and LSL children were registrered. Three of these were primarily verbal conversations, mainly comments on the play. These dialogues could be named "adapted information" according to Piaget's definitions (1959). The remaining dialogues were "acted conversations" and not performed by verbal means.

The dialogues between the LSL children were mainly characterized by one child making a verbal comment about something concerning the ongoing play, and the partner answering this comment by an action or by a movement of the head or the body. Seventeen dialogues with these characteristics were registered. All but one could be defined as "adapted information". The exception was one comment that could be defined as "criticism".

Seven dialogues were performed primarily by verbal means of communication from both of the children. In one of these verbal conversations a question was posed, otherwise only comments on the play, "adapted information", were made.

Finally, 2 dialogues were performed by nonverbal means of communication from both the children involved. These "acted conversations" concerned the ongoing play.

*) Capital letters are used for formal signs. /.../ is used when translating the sign language sentence to English. Small letters without brackets are used when the children use speech or articulation. Capital letters with hyphon is used when the children are fingerspelling a word.

VIII.1.1.3 The use of verbal and nonverbal means of communication in the dialogues

The analyses of the dialogues between the deaf children with early sign language experience ESL, showed that the children used signs, sometimes accompanied by speech sounds, articulation or lip movements. The ESL children also used a great variety of nonverbal means of communication, as facial expressions, body gestures, body postures and head movements. These nonverbal means were integrated parts of the verbal message. Except for head movements such as a head nod for "yes" and a head shake for "no", nonverbal means of communication were seldom used as substitutes for verbal utterances in dialogues between deaf children with early sign language experience.

The analyses of the dialogues between deaf children with late sign language experience showed that they, to a great extent, relied on nonverbal expressions as gross, sometimes exaggerated body movements, gestures and facial expressions. These types of nonverbal expressions were never observed among the deaf children with early sign language experience.

VIII.1.1.4 Turn-taking patterns in the dialogue

The dialogues between the deaf children started and ended, with few exceptions, with mutual gaze. If the child who took the turn, told the partner about an object or a person, present or non-present, there were deictic gazes towards this real or imagined object/person. If, on the other hand, the child was involved in a dialogue where he or she was commenting on the actions of the partner, there was usually mutual gaze all through the dialogue.

An example of a visual turn-taking pattern in a dialogue between two ESL children will be given. This example is from interaction no 24. The sequence lasted between the 14th and 19th second in the first minute of the analyzed interaction.

Time interval sec.	Judy; 5:07	Nick; 5:11
14	Looks at own activity	Looks at J. Touches her, tilted forward head
15	Turns around, looks at N.	Looks at J. deictic gaze at two girls; signs "THOSE TWO", headshake.
16	Looks at N., moves backwards	Looks at J. mimicry (wrinkled nose) signs "DO YOU LIKE"
17	Looks at N. head nod: "YES"	Looks at J.
18	Looks at N.	Looks at J. Starts to sign (gets interrupted by Chris)
19	Looks at Chris	Looks at Chris

The next example of a visual turn taking pattern is from a dialogue between two LSL children. This example is from interaction no 3. The sequence lasted between the 6th and the 11th second in the first minute of the analyzed interaction.

Time interval sec.	Susan; 5:11	Fredric; 7:00
6	Looks at own activity	Looks at own activity
7	Looks at own activity	Looks at S's activity, touches S.
8	Looks at F.	Glances at S., touches S. signs "LOOK" (mutual gaze)
9	Follows F's deictic gaze	Deictic gaze at own activity, holds the sign "LOOK"
10	Looks at F., signs "YES"	Looks at S., holds the sign "LOOK" (mutual gaze)
11	Looks at own activity	Looks at S's activity

VIII.1.2 Initiation of contact

The deaf children were observed to initiate contact with their partners by means of touching the partner's hand, arm or side of the body, by leaning forward towards the partner or by a tilted head or by a handgesture, like waving the hand in front of the partner to get his or her attention. There were also combinations of these means of communication in order to get the attention of the partner.

213 initiations of contact were registered in the analyzed interactions. These initiatives of contact have been analyzed, taking into account whether the children used bodily contact or not. The consequence of the initiations have also been taken into consideration, see Table 9.

An initiation of contact could lead to a dialouge, to a joint activity or to a rejection of contact. The initiation of contact could be observed by the partner but with no joint activity as consequence. Finally the initiation of contact could be unnoticed by the partner.

The initations of contact had in most instances the obvious goal of wanting to tell the partner something; to start a dialogue or a joint activity.

As table 9 shows, the ESL children made 38 contact initiatives to other ESL children of which 21 (55%) were followed by dialogues or joint activities.

104 contact initiatives were registered between the LSL children, of which 39 (37%) led to dialogues or joint activities.

Table 9. Frequency of occurrence of initiations of contact.

	Consequence					
	Dia-logue	Joint activity	Rejec-tion	Observa tion	Not noticed	Total
Between ESL children:						
with bodily contact	10	1	2	4	2	19
without bodily contact	3	7	4	4	1	19
From an ESL to a LSL child:						
with bodily contact	-	1	-	2	-	3
without bodily contact	2	25	-	4	4	35
From a LSL to an ESL child:						
with bodily contact	1	2	1	-	-	4
without bodily contact	1	10	1	4	13	29
Between LSL children:						
with bodily contact	12	15	10	12	13	62
without bodily contact	2	10	3	16	11	42
TOTAL	31	71	21	46	44	213

When the children were playing in mixed groups, the ESL children made 35 contact initiatives without bodily contact towards LSL children and 3 by means of touching the partner. 28 contact initiatives (74%) were responded by the partner and a dialogue or a joint activity was the consequence.

The LSL children made almost as many contact initiatives towards the ESL children as vice versa - 33 as compared to 38. Four contact initiatives were made by means of bodily contact. 42% of the contact initiatives were followed by joint activities or dialogues, (as compared to 74% for the ESL children). Thirteen (39%) of the contact initiatives from a LSL child to an ESL child were not noticed by the ESL child.

It was found that in the 44 cases where one child initiated contact, without the partner noticing this, 37 (84%) were exhibited by deaf children with late sign language experience.

Of these 37 not noticed contact initiatives from the LSL children, 25 (68%) were initiatives when the LSL children used vocalizations to call their partner's attention.

In some instances,the children used vocalizations accompanied by a pointing gesture or a leaning forward behavior, but without assuring that they had the partner's attention.

There were also contact initiatives from one child to a partner where the child had the partner's attention, but without the partner giving any noticable response.

A nonresponse can be one way of telling the partner that "I'm not interested in what you are about to say". A nonresponse can also be a way of saying that "I don't understand".

In order to get a better overview over both the reasons for not answering the child's contact initiative and also how the contact initiatives were displayed, see table 10.

Table 10. Observed but not answered contact initiatives.

	Contact initiatives mainly:	The partner's answers interpreted as: "not interested"	"don't understand"	Total
From an ESL to another ESL child	verbal	3	-	3
	nonverbal	5	-	5
From an ESL to a LSL child	verbal	1	-	1
	nonverbal	5	-	5
From a LSL to a ESL child	verbal	-	3	3
	nonverbal	1	-	1
From a LSL to another LSL child	verbal(vocal)	17	8	25
	nonverbal	3	-	3
TOTAL		35	11	46

Characteristic of the nonresponded, nonverbal contact initiatives was when one child approached a partner and either touched or only looked at the partner, and by a head movement or a gesture indicated that he or she wanted to join an ongoing play, or that he or she wanted the partner to join a play. In none of these cases it was considered that the partner did not understand what the child had in mind, rather that he or she showed no interest in joining the play or no interest in letting the partner join in the play.

Of the nonresponded contact initiatives 70% were displayed primarily by verbal means. A child could be observed starting to sign or to speak to the partner, but without the partner answering. In 35% of these verbal, nonresponded contact initiatives, the behavior of the partner indicated that he or she had not understood what the child had wanted. In the remaining instances of verbal, nonresponded contact initiatives, 65%, these were comments that the partners did not show any interest in knowing about.

In the nonresponded and not understood contact initiatives the children used speech or vocalizations, i.e. the children started to talk to their deaf partners with the obvious intent of opening up a conversation. It was only the orally trained deaf children with late sign language experience who used this communicative strategy in initiating contact with a partner. These nonresponded contact initiatives performed by vocal means of communication were in fact breakdowns in communication, as the partners could not hear and therefore not understand what the child uttered.

VIII.1.3 Synchrony in body movements

Transcriptions of the deaf children's behaviors were made second by second. For most of the behavior units transcribed, this has been an adequate level of description. To make more detailed studies of synchrony in body movements, tenths or hundredhs of seconds would have been needed.

Only "gross" patterns of synchrony in body movements, lasting one second or longer, have been possible to register in this study.

The analyses of the behaviors of the children revealed that there were two different types of synchrony in body movements between the children at play. The first type of synchrony in movement included short movements with the hands or the whole body when the children were drawing, walking, taking a seat etc. "Short" is defined as those movements lasting between 1 and 4 seconds. In these instance there were no mutual gaze.

The second type of synchrony in body movements that were identified, were clearly adapted movements by one child adapting to a partner's movements. The child was in these instances looking at the partner, or there was mutual gaze. These movements, adaptations to a partner's movements, were longer, lasting between 3 and 14 seconds, with a median duration of 7 seconds.

In all 19 instances of synchrony in body movements were registered. Twelve of these were short body movements classified as belonging to the first type of synchrony in movements. The remaining 7 instances were classified as belonging to the second type, where a child adapted the body movements to those of a partner. The two types of synchrony in body movements were registered both for ESL and LSL children. There were also a third type of synchrony in movements. This synchrony occurred when a child was watching a partner signing.

Condon (1979) has described, from films taken at 48 frames per second, how listeners move in precise synchrony with the articulatory pattern of a speaker's speech. He has also shown how a speaker when talking, moves several parts of the body at the same time. Kendon (1980) describes the same phenomenon. An infant has also been observed to move the hands in synchrony with the deaf mother's signs (Maestas y Moores, 1980).

This synchrony in body movements could also be observed in the deaf children's conversations, although no detailed analyses of synchrony in movements during dialogues have been made. When the children have been engeged in conversations only the phase "dialogue" has been scored.

VIII.1.4 Pseudo dialogues

In a couple of conversations, at first defined as "dialogues", it was found that there was a lack of mutual understanding between the children involved. It turned out that these "conversations" only had a superficial resemblance of a dialogue - with one child telling the partner something and the partner answering to that comment.

These conversations, resembling the dialogues, were labelled pseudo dialogues.

The pseudo dialogues were not frequently registered in this study. Only 3 pseudo dialogues were found in the analyzed interactions. Two of these will be described in section VIII.2 and VIII.3.

VIII.1.5 Joint attention

This phase was scored when the children looked up at the same time and observed a third person or an event outside the play area.

The child and the partner could be watching a third child in the group, or turn their attention to something happening in a room next door. When a teacher joined the group and asked the children something, there was often "joint attention".

In two observations between deaf children not sharing a linguistic code, i.e. one child used signs in communication while the other mainly relied on speech or rather vocalizations, "joint attention" was practically the only activity the children were engaged in together. These interactions will be presented in section VIII.3.5 and VIII.3.6.

VIII.1.6 Imitations

In the interactions analyzed, 29 "imitations" were registered. The analyses of these imitations showed that they had at least two different functions. The first function was recognized as a way of understanding the partner's actions and reactions. Six imitations, 5 from a younger child to an older partner, and one from an older child to a younger partner, were considered to serve this function. Examples of the first funtion was when a younger child watched an older partner's actions and started to make the same actions or movements as the older one. In these instances there did not seem to be any intention of communicating a message to the partner, rather to try to understand the purpose or the meaning of the partner's actions.

The second function of the imitations registered was recognized as as a way of joining or taking part of other children's play. Of the 29 registered imitations, 21 were judged to have this second function. The remaining 2 imitations were difficult to classify as they contained elements of both functions.

In the second type of imitations, there was an obvious intention to communicate. Imitating a partner's movements or actions seemed to be a very rapid and uncomplicated way of telling the partner that the child wanted to be part of the play. By the imitating movements or actions the child seemed to tell the partner that the child joined in the partner's play without having aspirations of being the leader. Examples of imitations will be presented in section VIII.2.2.

The two different types of imitations were found both for the ESL and for the LSL children.

VIII.1.7 Attention to partner/Joint activity

This phase of interaction came to contain many different actions and behaviors when the children were playing together. The children could be observing the partner's play; the children could dance or play a game together. Gestures, body movements, visual behaviors and other nonverbal means of communication were used in this phase of interaction.

One of the nonverbal behaviors observed repeatedly during joint activities will be discussed in more detail. It was a body gesture that once identified, was found in almost every observed and analyzed play session. The body gesture was interpreted as giving information to the partner about the ongoing action; that the activity was "for fun", and not to be taken seriously.

The body gesture was identified as a rapid movement with one or several parts of the body. It could be a short movement, lasting only a second or two, or it could be a prolonged and repeated movement, lasting several seconds.

As an illustration of this body gesture, the follwing example will be given (interaction no 11):

> Two deaf girls, Lisa, aged 3:7 and Lotta aged 3:10 are dressing up in different fancy clothes*. Lisa takes a hat and puts it on her head. She picks up a second hat and puts it on Lotta's head. But this is not appreciated by Lotta: she gets stiff in her whole body and stands motionless for several seconds. Lisa reacts to the difference in Lotta's behavior: she takes a few steps backwards and looks at Lotta. There is a short pause. Then Lisa starts to make short twisting and rocking movements with her whole body, while looking at Lotta. Lotta looks back and within a second she makes the same twisting and rocking movements. The girls continue to play together.

The description above may be interpreted as an interaction of the following kind:
Lisa made something that Lotta did not approve of and the result of her behavior could have been a conflict. But Lisa solved the situation by making this body gestures having the meaning: "What I just did was not to be taken seriously, it was only for fun".

The message was received by Lotta, and understood, and the play could continue.

There were many occurrences of the deaf children making this gesture referring to the ongoing play. Some of them will be described in the following sections.

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*) The children will be presented in more detail in section VIII.2.

But the body gesture was not always understood, or interpreted by other children as having the meaning "this is only for fun", however, as will be described in an interaction between two LSL boys in section VIII.3.7.

VIII.1.8 Attention to own activity

When the children were busy with their own activities without looking at each other or without commenting on the situation, this phase was scored. The phase was frequently used as the video recordings were taken in situations where the children were drawing, painting, working with indian pearls etc. In these situations the children were busy with their hands, producing something, which somewhat prevented them from communicating in signs with their partners.

VIII.1.9 Initiation of new play

When the children were playing, either engaged in joint activities or with own activities, one child could be observed initiating a new part of the play. For example; instead of walking around with a pram the child starts to cook food at the oven. If the partner followed in this new play, this phase was scored. There were no initiations of contact. This phase was noted in 7 interactions, 6 of which in interactions between ESL and LSL children and one between LSL children. In these instances one child, either an ESL or a LSL child could be observed to leave the ongoing activity and start a new one, and the partner following the child.

In the mixed group interactions, there were less amount of dialogues and less amount of bodily contact initiatives than in interactions between ESL and LSL children, respectively. In the mixed groups, communication was primarily based on actions. Instead of telling the partner about intentions or new ideas in the play, the child just started a new activity.

VIII.1.10 Observation

Before an interaction started, one child could be observing two or several other children's play before joining in. In the analyzed observations there were only a few instances where "observation" was scored for a child.

VIII.1.11 Rejection of contact

This phase in the interaction between the children could be a consequence of an initiation of contact from the partner, or as a response to a disapproved behavior of the partner.

In all 32 rejections of contact were registered, of these were 27 made by means of physical contact; e.g. the child pushed away the partner's hand or body. The remaining 5 rejections, were performed by means of a body posture, e.g. an akimbo posture, by a determined facial expression, by a waving hand gesture, by a headshake; or by combinations of different body expressions (see table 11).

The reasons for the rejection of contact were categorized as: involved in fights or wrestlings, trespassing the partner's personal or social space, breaking the rules of the play or interruptions of ongoing play or conversation.

Table 11. Reasons for rejection of contact.

- Involved in wrestlings and/or fights, including fights over toys	13
- Trespassing the partner's personal or social space	6
- Breaking the rules of the play	8
- Interruptions of ongoing play or an ongoing conversation	5
TOTAL	32

Twenty of the rejections of contact were exhibited by the LSL children in interaction with other LSL children, while 9 were between ESL children in interaction with other ESL children. The remaining 3 happened in mixed groups.

VIII.2 Descriptions of interactions for deaf children with early sign language experience (the ESL children)

In this section, descriptions of interactions for five deaf children with early sign language experience will be presented.

The children will appear in interactions with other deaf children with early sign language experience, but also in interactions with deaf children with late sign language experience.

Common to the five deaf children, four girls and one boy, presented in this section is that, except the early introduction of signs in communication, none of them has been subjected to oral/aural training. The parents learned to use signs as soon as their children were diagnosed as profoundly hearing impaired.

The analyses of interactions when these children were playing together showed that they were very attentive to their partners; they looked frequently at the partner's face or the partner's

play during the interactions. There seemed to be a channel open for communication between these children most of the time. When they wanted to start communicating with a partner, they first looked at the partner and watched what he or she was doing, until making a contact initiative.

When in dialogues with partners, also with early sign language experience, the ESL children used signs, sometimes accompanied by speech sounds, structured lip movements or articulation. They also used a sophisticated pattern of nonverbal behaviors such as pointing with the eyes locating a nonpresent person or object, pointings with the hands or the whole body, body postures and

body movements in the dialogues, both as parts of the signs, as semantic modifiers of an individual sign or a sign sentence, and as regulators of the communication. The dialogues became more elaborated and complex, the older the ESL children were. In the conversations, past and future events were dealt with as easily as the "here and now". The children discussed real events but were also exchanging meanings in fantasy plays. There were no pseudo dialogues between the ESL children, i.e. that the children were involved in dialogue-like exchanges without understanding the partner.

There were two pseudo dialogues registered between an ESL and a LSL child. One of these will be described in the verbal descriptions. The ESL child in this interaction (see section VIII.2.3) tried in different ways to modify her way of communicating in order to get the LSL partner to understand, but did not succeed.

In some instances there were incidences between the ESL children when they were at the starting point of a conflict. The children solved these situations by using verbal means of communication in combination with a complex pattern of nonverbal expressions.

VIII.2.1 The beginning of an acquaintance: Two ESL children
Interaction no 9*

The first description of interaction is between deaf children with early sign language experience. The deaf children involved were two girls, Eva 3:2 and Lisa 4:3 years old.

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*) The numbers of the interaction refer to the analyzed interactions, listed in Appendix 3.

The oldest girl, Lisa, is profoundly deaf. Her parents suspected a hearing impairment when Lisa was a couple of months old. But as Lisa, according to the parents, from an early age was very competent in communication they felt unsure whether their suspicion was justified or not. Her profound hearing impairment was diagnosed when she was two years old. Her parents started to use signs in communication shortly afterwards. When Lisa was three years old she started kindergarten where she joined a small group of other deaf childrer. Lisa has never been subjected to oral/aural training.

Eva's deafness was suspected when she was a couple of months old and diagnosed when she was almost one year of age. The parents started to use signs in communication almost immediately after diagnosis had been made. Eva started kindergarten when she was three years old. She was thus quite a new member of the preschool group at the time of this observation.

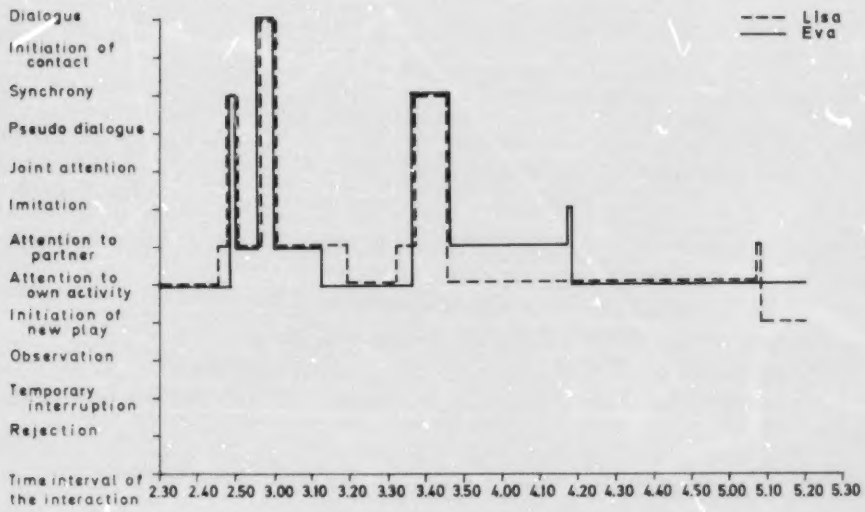
When this interaction was videorecorded, Eva and Lisa were still new to one another. Later on they became very good friends. Analyses of the interaction show the beginning of a pattern of interaction that became more elaborated and more complex as the children grew older and as they became closer friends: when they were involved in joint activities or in a dialogue they were very attentive to one another. They waited for their turn, without interrupting the partner. They used smiles and tilted head when in communication and there were instances of synchrony in body movements.

Description of the interaction

The two girls are seated orposite each other at a table. They are drawing on big white sheets of paper. Eva leaves her seat and returns a short while later with a new paper. Fig no 4 is a graphical illustration of the flow of interaction between the two girls when Eva has returned to her seat.

When Eva is seated, she starts to draw again. Lisa is sitting watching Eva. Their eyes meet when Eva looks up and a joint activity starts between the girls. It begins by Eva pointing at her drawing, showing Lisa, by hand and arm movements what she is drawing. When she has finished, she leans slightly backwards and watches Lisa. Lisa has been watching Eva the whole time. There is a short pause. Eva repeats the same

Figure 4. Phase-flow diagram of the interaction "The beginning of an acquaintance."



demonstration; to show Lisa what she is drawing. Lisa responds by shaking her head and she starts to make circular movements with her right hand just above the paper. Lisa is moving her whole body as well as the arm and hand, while demonstrating her way of drawing to Eva. Eva watches Lisa, holding a pen in her mouth. Eva returns to her work and they both start drawing again. A moment later we can observe Lisa watching Eva. Eva looks up and within less than a second they are each holding their pens in their mouths. They are also seated in synchroneous positions.

Comments

During this short sequence of interaction, lasting 2.30 minutes, the girls primarily used nonverbal expressions in communication, as smiles, head movements, pointings and actions. They used signs too, but not for communicative purposes, rather in directing themselves when they were working. Lisa, for example, signed "/a/ BIG PICTURE LATER" when she was drawing. She was very concentrated on her task and there didn't seem to be any intention of transmitting a message to Eva.

Registrations of the girls' direction of gaze showed that they looked at their own activities most of the time, but that they were looking up every now and then and observed the partner's activities. When they wanted to tell the partner something, they looked up, met the partner's eyes and started a dialogue.

VIII.2.2 How to join an ongoing play: Two ESL children
Interaction no 17

The next observation of Eva and Lisa to be presented was made six months later. The children were now 3:8 and 4:9 years old, respectively.

This observation showed a situation when one child, Eva, wanted to join in other children's play and succeeded. The way Eva behaved in this situation is an illustration of her knowledge of social rules in communication.

The context is as follows:
Lisa and Jonas are engaged in a role play. Jonas is seated at the far end of a small sofa. There is a table in front of him. A similar sofa is placed at the opposite side of the table. Lisa is busy arranging a meal for herself and Jonas.

Jonas is a boy of 3:6 years. He participated in this interaction and in the next to be presented (see section VIII.2.3). Jonas' behaviors have not been transcribed as he was only partially seen on the screen and as he had a very subordinate role in these interactions.

Description of the interaction

The analysis starts when Eva enters the room. She walks with dawdling steps, looking at the other children in the room. After a short while she approaches Lisa and Jonas. When Eva is close to the sofa, where Jonas is seated, her steps become more rapid and determined and she puts one hand on the side of the sofa. It looks as if she intended to take a seat. At the very same moment Lisa reacts. She shakes her head, stretches out her hand towards Eva and waves avoidingly: "NO". Eva moves backwards a couple of steps. Lisa starts to sign to Eva. She is using her voice as well but there are no structured lip movements. She explains to Eva that the seat next to Jonas is her seat and that she and Jonas are playing together. Lisa also demonstrates the situation by pointing with the eyes and with hand gestures.

Eva looks at Lisa and the two girls are standing face to face, motionless for one and a half second. After this pause, Eva looks down, starts to tilt her head to the side and she

smiles. Then she looks up at Lisa again.
She signs "/can't/YOU/and/I? WE TWO?"
Lisa changes her mind: "YOU/and/LOTTA/can/SIT THERE". She points at Eva and Lotta, another deaf girl who is now standing behind Eva, and in the direction of the sofa opposite Jonas.
Lisa then explains the situation to the two girls, Eva and Lotta:
"JONAS IS EATING". When she signs, she uses her voice and several times clearly recognizable words can be heard, as for example the name "Jonas".
Eva takes a seat in the sofa and she is now in the play.

Comments

When Eva approached the sofa and put her hand on the side, Lisa immediately noticed what was about to happen. She reacted and used verbal means, signs, to explain the condition of the play to Eva. Eva did not insist in joining the play. Rather she withdrew and waited and there was a pause lasting one and a half second.

Eva's next effort to join the play was by using diverse nonverbal means of communication, as tilted head, smiling, looking down the floor and then looking up again, until she posed the question: "can't you and I play". This time she succeeded and was allowed to join the play.

VIII.2.3 A different strategy in joining other children's play: An orally trained child with late sign language experience (a LSL child) enters
Interaction no 18

A similar situation happened a couple of minutes later. This time a severely hearing impaired girl, Maria, entered the room. She too joined the other childrens' play, but in quite a different manner. This interaction will be presented as an illustration of a contrasting strategy in social interaction.

Maria, 4:5 years old, has been orally trained since the diagnosis of a hearing impairment at the age of 1:6. When Maria is three years old she is placed in the kindergarten with groups of signing deaf children, as Maria's social development had become a matter of concern.

Description of the interaction

Eva, Lisa, Jonas and Lotta are preparing a breakfast meal. Lisa is making the table and serving the meal, while the others are seated. When Maria enters the room, she walks straight up to the table where Lisa is now standing and she pushes Lisa aside to make room for herself. Then she moves to take a seat in the sofa and Lisa tries to stop her, by holding her arm in front of Maria.

Maria is strong and Lisa turns to the teacher who is sitting on a chair a few steps away. As Lisa changes body position, she takes away the arm that she has been holding in front of Maria. Maria rapidly creeps up into the sofa by swinging her right leg over the side of the sofa. The leg and foot is directed towards Lisa, but without touching her. Eva who is sitting at the opposite side of the table, takes Maria's arm and tries to stop her. Maria is stronger than Eva, however, and succeeds in taking a seat.

The teacher responds to Lisa's plead for help by telling her to explain to Maria that she has taken the seat belonging to Lisa. Lisa makes a second attempt and she now signs and uses her voice simultaneously. Her voice is clear and several words can be distinguised: "THAT IS MY SEAT".
This time Maria answers. She makes a sweeping movement with her head, first as a nodding, then as a shaking of the head. It looks like a "YES-NO" answer.
Maria does not wait for any further comments from Lisa, but tries to take a plate Lisa is holding. "No" says Lisa.

Both Lisa and Maria turn to the teacher. The teacher tries to explain to Maria what she has done; that it is not allowed to take someone else's seat and that Maria has to move in order to let Lisa have her seat. The teacher uses signs and speech simultaneously. She speaks and signs very slowly and with distinct hand movements in order to make Maria understand. Maria watches the teacher and when she has finished talking and signing, Maria moves towards Jonas and makes room for Lisa. Lisa takes a seat.

Figure no 5 is a graphical illustration to Eva's joining the play and figure no 6 illustrates Maria's entrance.

Figure 5. Phase-flow diagram of the interaction "How to join an ongoing play": Eva's entrance.

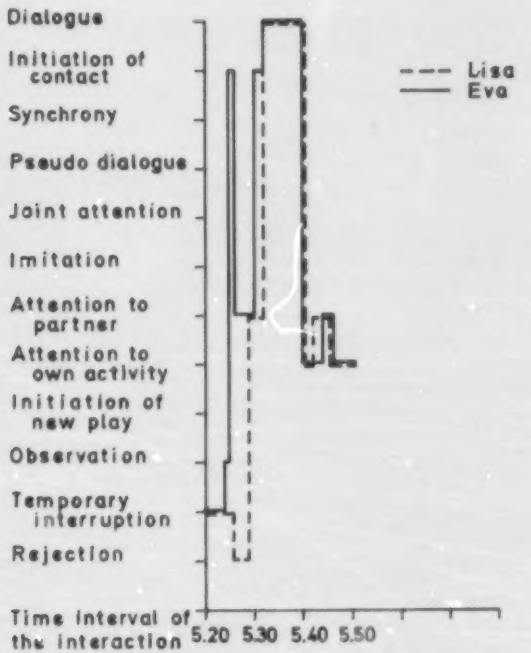
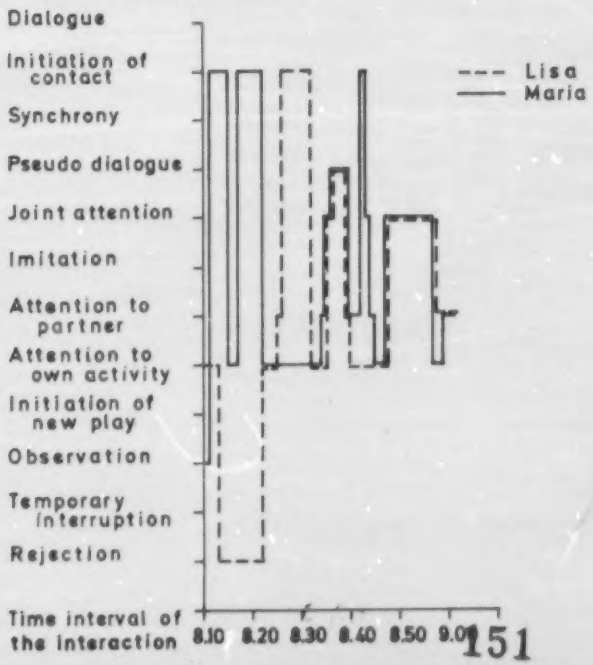


Figure 6. Phase-flow diagram of the interaction "A different strategy in joining other children's play": Maria's entrance.



Comments

It took Eva 15 seconds to be accepted as a member of the play. The corresponding time for Maria was 35 seconds.

Figures 5 an 6 show that the amount of shifts in phases were considerably less in the interaction between Eva and Lisa than between Lisa and Maria. Eva and Lisa rapidly reached a stage of mutual understanding. It took both more time and more effort to reach this stage between Lisa and Maria.

The two girls, Eva and Maria, used very disparate strategies when joining the ongoing play. The first indication of Eva wanting to take part in the interaction between Lisa and Jonas, was the way she approached the sofa - she walked in a slightly more rapid pace - and the way she put her hand on the side of the sofa.

She approached the social space of the other children, but in a very moderate way. Lisa, a child that we several times had observed to be a child sensitive to social rules in communication, reacted to Eva's movements and informed her about the situation.

What then happened was maybe the most crucial signal during this interaction - the pause.

Eva looked down the floor, a signal that in this situation was interpreted as "I will do the play the way you want it". When she looked up, with a tilted head and a smile on her lips and asked if she possibly could join the play, she got permission to this.

Both Eva's and Lisa's behaviors during this short sequence is an illustration of the complex rules of social interaction.

Maria had no knowledge of these social rules. She took no notice of the other children's reactions when entering the play. When restrained from taking a seat, she used her strenght to make her way.

When Lisa tried to explain to Maria what she had done, Maria did not notice her at all. When Lisa used her voice and signed simultaneously, Maria watched her and gave a "yes-no" answer, i.e. an answer that made no sense. This nonsense answer was immediately followed by Maria trying to take an object from Lisa. There was no mutual understanding between these two girls. Lisa's efforts to explain the situation to Maria did not succeed, in spite of her modification of the message.

Lisa's verbal utterance and Maria's answer had the overt characteristic of a dialogue, but as there was no mutual understanding, it was defined as a "pseudo dialogue". When the communication had broken down, the children turned to the teacher. This situation was very typical when Maria was interacting with other children, both hearing and deaf children. Her ability to communicate with other children was minimal. When she did not understand, like in this situation referred to, she used to turn to an adult.

The communication strategies used by Maria: as taking no notice of the partner's reactions, actions or initiation of contact; the incidence of pseudo dialogues and the teacher trying to explain the messages of other children, were Maria's usual way of interacting regardless of whether the partners were deaf or hearing.

These strategies were not something typical only of Maria. Other deaf children with late sign language experience and/or orally trained had been observed using similar communicative strategies (e.g. see Preisler, 1979).

The two girls'use of different communicative strategies in their interactions with other children, were further revealed in the play that followed.

When Eva joined the play between Lisa and Jonas, the children played the role play, initiated by Lisa and Jonas. Eva did not alter the rules or make other rearrangements. There was a peaceful and quiet athmosphere between the children. When Maria

entered the play, it changed character; from quiet, rule governed to a more chaotic and loud play. Maria started to play with the plates and the saucespans.

She made rapid movements. The other children watched her, then slowly followed in this new type of play. They started to make gross body movements and the play ended in all the saucespans and the plates falling down on the floor. The teacher interrupted and stopped this game. Her order was immediately obeyed by all the children, except Maria.

VII.2.4 A discussion of the loss of a hearing aid:
Two ESL children
Interaction no 21

The last interaction between Eva and Lisa to be described was made when Eva was 4:4 years old and Lisa 5:5.

The two girls were involved in a dialogue most of the analyzed period, that lasted 2:40 minutes. The children exchanged meanings about the "here and now" as well as about the past and the future.

Description of the interaction

The two girls, Lisa and Eva, are seated in a small sofa in the play room. They are both facing the camera. Each of them has a big white paper and lots of pens in front of them. Before they start drawing, there is a discussion about what is best - short or long stockings. This discussion is then followed by a conversation about wearing hearing aids.

A graphical illustration of this observation is given in figure 2, page 115.

The interaction begins by Eva touching Lisa very gently with her left hand on Lisa's right arm, while smiling and laughing. Lisa touches Eva the same way as Eva just did, then makes dancing movements with her right arm in front of herself. Eva laughs at this "show". Eva glances at her stockings and then starts to fold up her pants to have a better look at her long stockings. Lisa watches her, then makes a similar action.

When Eva is ready with her pants, she calls Lisa's attention by gently touching her on the upper arm. Lisa looks up and Eva starts signing, looking at her own leg, i.e. at the object she is going to refer to.
"I DON'T LIKE SHORT STOCKINGS, I DON'T LIKE TO HAVE THAT".
She demonstrates to Lisa what she is wearing underneath; she has tights.

Lisa watches Eva and leans forward to have a better look at Eva's tights. Eva then shifts her attention from her tights to her sweater. She looks down and notices that she does not wear her hearing aid. She looks at Lisa, who looks back,and signs:
"I HAVE NO HEARING AID" (Both girls are equipped with body aids).

Lisa looks underneath her blouse at her body aid and then demonstrates that she is wearing ear molds in both ears.
Eva looks at her and utters:
"I DON'T HAVE" and turns first her right, then her left ear to Lisa, showing that there are no ear molds.
"I HAVE LOST THE HEARING AID/it is/GONE. I HAVE NOT SEEN IT"

When Eva signs she ures her voice and several words can be distinguished. For example the word "lost" (in Swedish: borta. Eva: bo:ta); hearing aid (in Swedish: hörapparat. Eva: hø:appa:).

Lisa answers:
"YOU WILL GET NEW ONES WITH THE MAIL, FROM THE DOCTOR". Lisa uses her voice too.
"BUT I WILL GET A LETTER/ from / THE POST" Eva replies and several spoken words can be distinguished.
Lisa remarks: "BUT I CAN'T HEAR/ without a hearing aid / I WANT TO HAVE A LETTER".
Eva proceeds: "WITH A HEARING AID IN THAT LETTER".

There is a short pause, then Eva proceeds:
"DON'T WANT ..." She hesitates then begins to sign again:
"I HAVE RECEIVED/ a / HEARING AID IN/ a /LETTER BEFORE, BUT IT DIDN'T COME NOW. I HAD TO WAIT A LONG TIME".
She looks at Lisa who continues: " / a / LONG LONG TIME".
Eva is not quite sure about the time aspect:
"NO I DON'T THINK/ such / A LONG TIME, I DON'T THINK / so /"
"I HAVE ALSO RECEIVED A LETTER", Lisa comments.

Then Lisa changes the subject. She looks at a doll in the corner of the room. She points at it and Eva looks in the same direction.
"BIG EARS FALL DOWN" Eva signs and shows Lisa how big ears fall down on the floor. She laughs and makes a pantomime about a doll on the floor. She looks back at Lisa, who then comments on the discussion about the hearing aid:
"LONG TIME UNTIL..."
Eva interrupts Lisa, by gently touching her on the arm and Eva demonstrates a second time how the ears of the doll will fall down on the floor.

The two girls then turn their attention to their papers and pens. Eva takes up her big white paper and puts it in front of her face. Lisa follows and makes the same movements. We are not allowed to take part in their conversation any longer.

Comments

The two girls were involved in dialogues during two thirds of the analyzed period. The conversation was smooth and there was a mutual understanding between the girls. Both girls were attentive to the partner's actions and reactions and they waited for their turn, when they wanted to tell something. When they wanted to have the partner's attention, it was attained by a gentle touch.

There was mutual gaze in the beginning and at the end of each utterance. The child who was signing looked at what she was signing about, while the partner watched the face of the child. The two girls used signs and vocalizations, articulation and distinguishable speech in conversation. Several words could be heard and/or seen on the lips of the children, even by an untrained observer.

The communication between these two girls was vivid, smooth and effortless. The meaning of the verbal utterances was enhanced by the use of mimicry, pantomime, gestures and body postures.

The second part of the discussion between the two girls was about the hearing aid. Eva disliked wearing her hearing aid and she had no benefit of it as she is totally deaf and only reacts to vibrations. Lisa on the other hand liked to wear her aid. Her hearing impairment is less profound than Eva's and her hearing is improved by the use of an aid.

Both girls know perfectly well that a hearing aid is of no use to Eva, while Lisa really benefits from wearing her aid. That both girls are aware of this difference has become evident in several discussions between the girls on the use of hearing aids - discussions reported by their parents.

VIII.2.5 A young social agent: An ESL child among LSL children

Lisa and Eva not only played with each other or with other deaf children with early sign language experience. The children's groups changed members about once a year as some of the children started school while others entered preschool activities.

When Lisa, the oldest girl of the five children with early sign language experience, started kindergarten she joined a group of deaf children older than herself. Sign language was introduced for these children about the time of entrance to the kindergarten. Several video recordings were made when Lisa was engaged in different activities with these children.

Three examples of interaction between Lisa and older deaf children with late sign language experience will be presented. Lisa is between 3:5 and 3:9 when we now meet her, i.e. younger than in the preceeding examples. Observations when Lisa was with her teachers and when Lisa was discussing with her parents during this first preschool year, showed that Lisa already at this age had a rich vocabulary of signs.

The examples have been chosen as they show the leading, although not dominant role this child had when in interaction with deaf children not commanding sign language to the same extent she did.

VIII.2.5.1 Initiating and controlling two play sessions
Interaction no 1 and 2

The first example is an illustration of Lisa's ability to initiate activities and to control a play situation with children older than herself.

When we now meet Lisa, she is 3:5 years of age. She is seated at a circular table painting small clay figures together with Susan 5:7, Eric 5:5 and Lotta 3:8.

First a presentation of the children:

Susan is deaf, a deafness diagnosed when she was one year old. The parents have primarily used oral/aural training in communicating with the girl. When she was four, Susan entered preschool activities with other deaf and hearing children. At this age, Susan was introduced to sign language for the first time. Both parents and teachers started to use signs in communication with the girl. This resulted not only in a rapid improvement in Susan's language development, but also a rapid improvement in her social development.

Eric is severely hearing impaired, an impairment that was diagnosed a couple of months after his third birthday. Speech and auditory training was recommended, but did not prove successful. When he was four, signs were introduced in communication. He entered the kindergarten when he was five. During the first months in the kindergarten he did not sign to any noticable extent. But after a while he started to use signs in communication with other deaf children and adults to an extent that revealed that he had spent much of the first period at the kindergarten observing and learning how to sign.

The fourth child in the group, Lotta, has a moderate hearing impairment, diagnosed just before she was one year old. Sign language has been introduced recently as Lotta did not respond to speech and auditory stimulation to the extent that could be expected of a child with only a moderate hearing disorder. Lotta has not been subjected to oral/aural training.

Description of the first interaction

During the first part of the analyzed period, the children are very concentrated, they are almost absorbed by their work - the modelling of clay figures - and there are few instances of communication.

Susan is the only one trying to initiate some kind of interaction. She is watching the other children every now and then. She uses lots of different expressions like pantomime, mimicry, twisting body movements but also signs to comment on the situation. However, she gets very little response from the other children. They glance at her, then continue working with their clay figures. Susan's efforts to start joint activities are not responded to by the other children until Lisa joins in Susan's movements and actions:

After about two and a half minutes of work Lisa looks up, vocalizes and leans sligthly towards Susan with her left hand stretched out towards Susan with the fingers outstretched (she has paint on her fingers). Susan looks at her and smiles, a smile that becomes a soft laughter. She looks around at the three children in the group and makes a twisting movement with her body. Lisa looks at the other children too, still holding her hand in the air.

Not until Lisa joins in Susan's activities, do the other children follow. They start to move their hands and upper parts of the body in synchrony with Lisa's and Susan's movements.

Lisa is not only the child giving the start signal to a joint activity, she also has the capacity of putting it to an end: She makes a loud noice, almost like a scream then signs and vocalizes "STOP". She looks at Susan and then at Eric, repeating the comment "STOP". She smiles, Susan laughs and looks at Lisa. All of the children start to paint again.

Lisa signs with very distinct hand movement. She uses her voice and she looks at the children in the group, one by one, with a smile on her lips. She makes her message very clear to the partners.

The four children start to work again. But very soon Susan looks at the other children, making different poses with her face and body. She smiles and moves her upper part of the body in a twisting movement, holding her hands out from the body with bent elbows. She looks like a "fine lady". Lisa looks at her, then imitates the way Susan moves and twists her body. She joins in Susan's play once more. She stretches her hand, greasy from paint, towards Susan, but without touching her. The two girls laugh.

Again, when Lisa joins in the play with Susan, Eric and Lotta stop working and watch the girls. When Susan alone tried to attract their attention they did not stop working. Apparently it is only when Lisa joins in, that it seems to be permitted to take part in a play, instead of working.

Lisa moves her sticky hand several times towards Susan and once she happens to touch Susan's hair. As she looks so surprised afterwards, it can not have been on purpose. Susan laughs.

Eric, having watched Lisa's behavior, now gets up from his seat and approaches Susan. He touches her with his paint smeared hand and there is a stain of paint on Susan's white sleeve. Susan looks shocked and reproaches Eric in signs and with gestures. Lisa looks startled. She stands motionless, hands and fingers stretched out, watching the scene between Susan and Eric. Then she turns to one of the observers in the room. (The teacher was not present during this observation.) Lisa looks at the observer with an appealing expression, which clearly conveys the question: "Are you not going to stop this?"

The observer feels responsible for the situation. She fetches some paper towels and the children start to clean their hands.

Comments

During this interaction the children worked with concentration making clay figures. One of the children, Susan, made several efforts by means of body movements, body postures, facial expressions and gazes, to invite the other children to play and disregard the work. However, the girl did not succeed in this effort. When the youngest child in the group, Lisa, joined in the other girl's movements and actions, the other children followed and the interaction changed character - from work to play.

The children observed in this interaction - one with early sign language experience and the others with later sign language experience, used facial expressions, gaze behaviors, body movements, body postures and gestures while communicating. There were instances of attention to partners, joint activities, synchrony in body movements, contact initiatives but only one dialogue.

Description of the second interaction

The next example is also an illustration of a play between a child with early sign language experience and children with later sign language experience. A similar pattern of interaction as was described for the preceeding observation is now repeated.

When the children have finished painting, they start to play with a jig-saw-puzzle on the floor. The puzzle consists of big cards, formed lika circles with half moon cuttings at two sides. Each card has four different colored fields. Matched together properly, fields of the same color appear in quadrangles.

When they have been working about one minute, Eric, sitting on the floor, makes a twisting movement, retiring a few steps. He very soon returns to his place at the center of the floor, where all the cards are spred out.
(Analyses of the interaction showed the Eric's movements could be interpreted as the first indication of that the puzzle was difficult -maybe too difficult.)

Half a minute later, Susan makes a similar movement. She has been standing on her knees, leaning over the cards, trying to make a correct quadrangle, but in vain. Her feet have been beating on the floor repeatedly. (The puzzle was difficult, not only for Eric, but also for Susan.)

Susan looks around and watches how the other children manage to match their cards. She comments on the way both Lisa and Eric work, Eric ignores her comments, while Lisa clearly indicates that she does not want to be reproved for the way she solves this problem.

Lisa matches one card to another, but the colors do not match. Susan signs: "NO WAIT". The girls look at one another and Susan signs: "/ those are / NOT THE SAME / these are / THE SAME"

She looks at the cards, compare them. points at them and demonstrates to Lisa that the colors differ. Lisa looks at her, shakes her head and points at the colored fields. She makes a very distinct pointing movement, and she uses her voice. Lisa's face has a determined expression; she is holding herself upright, looking Susan straight in the eyes. She is distinctly signalling: "this is the way I want to have it". The message is very clear and Susan withdraws and starts working by herself.

After almost four and a half minutes of play, when Susan has tried intensively to match card after card, without success, she lets her right hand fall down into her lap and her body slumps. She looks around at Eric and at the adults in the room, then turns her attention to the cards.

Susan now changes strategy in her work with the puzzle: instead of matching both form and color, she ignores the colors and only matches the cards by form. At the same time her posture becomes casual and there is a noticable change in her body movements: she is twisting and rocking her body and shrugging the shoulders upwards several times. Her movements are more rapid than usual and she smiles. (These body movements have been interpreted as signalling: "what I am now going to do is not to be taken seriously, this is only for fun".)

Eric is watching the way Susan works. He turns to the teacher and signs "WRONG". He takes an akimbo position, with his hands to his waist with the elbows right out from the body. This "power" gesture does not influence Susan in her play. He then starts to pick up all the cards that Susan has put in the wrong order, but Susan continues to play in her own way. Lisa watches Susan and Eric and she now stops Eric by exclaiming in a loud voice: "noo" and "aj aj". Eric stops, looks at Lisa and makes a small movement with his hand downwards. He smiles at the same time. This gesture has been translated as "how childish of her".

(Eric does not interfere anymore with Susan's way of playing. By stopping Eric, Lisa has given Susan free hands to play with the cards the way she wants to.)

Susan moves around and works with the cards using her new rule. Then she lies down on the floor, on top of all the cards. She raises and takes a whole bunch of cards in her

hands and holds them above the head. Lisa now joins Susan in this new type of game. First she lies down on the floor the same way Susan just did, then raises and runs up to Susan. She succeeds in snatching a few cards from Susan and holds them above her own head. The two girls smile and laugh.

Comments

Although most of the interaction was between Eric and Susan, Lisa played an active role. Eric stopped interfering with Susan when Lisa told him to. Lisa gave permission to Susan to change character of the interaction - from work and problem solving to play. Also during this interaction, Lisa had control over the situation. When Susan tried to reprove Lisa for her way of working with the cards, Lisa clearly indicated that she did not want to have any comments on the way she worked. She wanted to find the solution herself. The way she told Susan this, made Susan to withdraw immediately.

Lisa was a child, sensitive to other children's actions and reactions, which made her to an appreciated member in all of the child groups where we have had opportunities to observe her. At the same time she had a very distinct way of telling her partners her opinion. She showed this very clearly, by vocalizations and signs but also and perhaps more importantly, by her body movements and facial expressions. There was never any doubt about what she wanted to express.

VIII.2.5.2 A play that starts without a goal, turns into a fantasy play
Interaction no 4

When Lisa is 3:9, Eric 5:9 and Lotta 4:0 they are observed in one of the small play rooms in the kindergarten.

This observation is an illustration not only of Lisa's ability to control a situation, but also of her ability to organize a play that starts with no obvious goal.

Description of the interaction

Eric and Lotta are standing at the side of a bookshelf, each holding a telephone receiver, imitating a telephone call. Lisa enters the room and joins their play.

During the first part of this interaction, Lisa follows Eric and imitates parts of his actions. (This imitative behavior was interpreted to have the function of telling Eric that she is "with" him, playing the game, the way he wants it.)

Eric takes a doll's pram and pushes it in front of himself. He is vocalizing at the same time. It sounds as if he is using the pram as a car. Lisa and Lotta start to put on different fancy clothes and hats. During the first part of the observed period, it is difficult to find a structure in the play.

After a while, Eric starts to walk with the pram in circles. Lisa has been watching Eric and now joins him. She puts a handbag into the pram. Then she takes a small suitcase in her hand and starts walking by his side. Lisa watches Eric's way of walking, then adapts her own steps in order to move in rhythm, in synchrony, with Eric. Lotta joins in the march too. The children walk in a big circle. Soon Lisa makes a waving gesture with her left hand: "HURRY UP". She starts walking faster and Eric and Lotta follow.

One of the teachers in the kindergarten enters the room. She asks the children what they are doing.
"/We are going/ FAR AWAY", Lisa signs.
After having marched around a few minutes, Lisa takes a seat at the table and the other children follow her.

Comments

This free play, that started without any obvious goal now turned into a fantasy play - the children were on a journey.

Analyses of Lisa's behaviors during this interaction showed that she was very attentive to her partners' actions. She adapted her own actions to the partners' when joining the play and also when she gradually turned the play into a fantasy play.

Lisa organized this play, but she did not give orders to the other children, commanding them to take different roles. Instead she showed by actions a possible way of playing and the other children followed her.

VIII.2.6 A role play: Three ESL children
Interactions no 22 and 23

The next group of children with early sign language experience that will be presented, entered preschool activities one year later than Eva. The children will be named Judy, Nick and Karen.

Sign language was introduced for Judy when she was about one year old. For Nick and Karen, sign language was introduced when they were 1:6 and 1:7 years old respectively. Neither of the three children have been subjected to oral/aural training.

When we now meet the children, Judy is 4:0 years old, Nick is 4:4 and Karen 3:11. The observation to be described show how a fantasy play gradually evolved between the three deaf children. At one instance, Judy and Nick were of different opinions about the ownership of a toy. The two children were very close to beginning a physical fight over the toy. However, the conflict was solved by verbal means of communication.

Description of the first interaction

When this interaction begins, Judy is busy preparing a cake. Karen is seated at the floor nursing her doll, while Nick is standing close to Judy trying to take a bowl from the stove where Judy is standing. He tries to take it several times, but Judy prevents him, by covering the bowl with her body or by an avoidingly arm gesture. Nick is not trying to take the toy by force; he makes gentle movements.

But finally Judy tells him off; she signs to him to stop trying to take the bowl. Her facial expression is very determined when she addresses Nick. Nick answers by explaining, in signs, that he needs a bowl for whipping the cream. Judy looks at him, then walks off to a shelf where the rest of the kitchen equipment is placed. At the same time Nick becomes engaged in a discussion with the teacher and Karen. He does not follow Judy to the shelf. The consequence of Nick's behavior is the following:

When the discussion with the teacher is over he approaches the shelf where Judy is standing and he picks one of the bowls, without any comment. Judy immediately reacts; she tries to stop him by holding his arm. Nick is older and stronger than Judy and he takes a grip on her arm. He starts to explain to Judy what he needs the bowl for. While explaining this, he holds Judy's arms with his right hand and signs with the left. After a few signs, he changes hand and holds her with his left hand and signs with the right. Judy does not look pleased, but she lets Nick keep the bowl.

Nick walks off and starts whipping the cream, while Judy takes out her cake from the oven. After a short while, she gets Nick's attention by a waving hand movement. Nick looks up and explains what he is doing. Judy answers that they can put the cream on top of her cake. The incidence with the bowl is over.

Comments

When Nick the first time explained to Judy that he wanted to have a bowl for wipping the cream in, Judy went off to the shelf. We expected Judy to give Nick another bowl. But Nick became engaged in a discussion with the teacher and did not follow Judy, i.e. he did not behave the way Judy must have expected him to do. Judy tried to get Nick's attention several times, when he was watching the teacher. She waved her arm in front of him a few times, but as he did not look at her, she stopped waving and did not interrupt the ongoing conversation. Finally she turned around and walked off. When Nick finally followed Judy, he merely took the bowl, without asking her permission. As he broke the expected rule, by not following Judy, he was not permitted this second time to merely take the bowl.

The situation that almost became a fight over a toy, was solved by Nick using verbal means to explain the reason for his behavior.

Description of the second interaction

The sick doll is soon cured, the cake is ready and the cream is whipped. Judy takes the telephone receiver and starts imitating a telephone call by making unstructured lip movements. The teacher asks Judy who she is calling. Judy explains that she is talking to grandfather. She is telling him to come to a party at "FOUR" o'clock or maybe at "FIVE" o'clock. She has some difficulties in deciding when he ought to arrive. Finally she solves the problem by signing with a very distinct hand movement that he should come "NOW".

All of the children become very busy, getting things ready for the visit. Nick approaches Judy, gets her attention, and starts signing: "I WILL GO AND FETCH GRANDFATHER". He signs slowly and carefully. Judy answers him, signing very rapidly: "GRANDFATHER IS COMING SOON" and she makes a determined head

nod at the end of the sentence. Nick starts to comment on the fact that he has whipped the cream to the cake, when Karen interrupts; she touches Judy on her cheek, gets her attention after several attempts and starts to sign; "GRANDFATHER MUST LOOK AT MY DOLL WHEN HE COMES". Nick is watching Karen, then turns to Judy and gently touches her with both hands on her cheek. He gets Judy's attention and starts to sign; "GRANDFATHER AND THE DOG ARE COMING SOON". He continues by making a pantomime about going out with the dog. Judy explains to him; "YOU MUST WAIT A WHILE". Nick answers, using formal signs; "I'M GOING OUT WITH THE DOG".

Karen addresses Judy and Nick again and repeats that grandfather must have a look at her doll the first thing he does when he arrives.

Nick walks off. He now acts as if he is taking care of a real dog. The imagined dog is tied to one of the legs of a doll's bed. He unties an imagined leash very carefully and looks down at the dog. He signs to the dog to be "QUIET", then he comments on the dog's behavior by signing that the dog is "NICE".

Comments

These three children with early sign language experience were discussing the ongoing fantasy play; both with respect to their immediate actions and to new events. The children used formal signs, pantomimics, expressive body movements and vocalizations when communicating. They exchanged meanings and there was a mutual understanding throughout the observed and analyzed sequence, although they did not always agree upon different matters.

VIII.2.7 Discussions between young deaf children
Three ESL children
Interaction no 24 and 25

One and a half year later, we will meet this group of deaf children again. Judy has now become 5:7, Nick 6:0 and Karen 5:6 years old.

Description of the first interaction

Judy and Karen are working with small plastic pearls of different colors together with Linda 5:3 years old, a third deaf girl in the kindergarten. Linda was new in the group of deaf children. She was only participating in these two interactions, and is not participating in the study. The girls are discussing what and how about arranging the pearls. After a while Judy stops her work, approaches Karen, touches her on the arm and gets her attention. She takes one step backwards and starts to tell Karen and Toni: "I'VE GOT GOLDEN STARS AT HOME, I HAVE. YOU CAN COME HOME TO ME ...". At this moment Nick enters the room and contacts Judy by touching her back. Judy turns around and looks at him. Nick shows her what he has in his hands - a self made wooden doll's bed. But Judy waves at him avoidingly.

Karen has been observing Judy when she signed about the golden stars, but when Judy turns to Nick, Karen looks at Linda and signs: "I HAVEN'T SEEN THEM". She shakes her slightly tilted head, wrinkles her nose. She looks sceptic. Judy turns to the girls again. They look at her and Judy repeats what she has just signed: "I'VE GOT MANY MANY GOLDEN STARS AT HOME, I HAVE, / I can /SHOW YOU". She nods her head as a confirmation of the statement. Now Karen seems more convinced about Judy's information and she nods her head in reply to Judy's utterance.

The girls start working with their pearls again. Nick is standing behind Judy. He looks at her several seconds before he touches her very gently at the back. Judy turns around and

looks at him. He starts to sign, the head is slightly tilted and forward: "DO YOU LIKE THEM?" He asks Judy and he points at the two girls. His nose is wrinkled, as if he did not like them.
(This morning Nick is irritated at the two girls because of something they have done).

Judy answers him with a very distinct head nod: "YES".

Karen is looking at Nick and his wooden bed. She touches him and gets his attention. She asks him in signs what it is. He holds the small bed in front of her and demonstrates it for her. Then he turns back to Judy and tells her: "YOU CAN COME HOME TO ME WOULD YOU LIKE / that /?" "I HAVE MANY MANY (golden stars) AT HOME". He underlines his remark by a distinct head movement forwards.

Judy looks back at him and nods her head "YES". Then makes the remark, looking and pointing at the two girls "THEY ARE NICE".

Judy catches sight of how the two girls find new pearls in the bucket where they are placed. She tells them: "/It's/ ONLY YOU / who / FIND, I DON'T. / that's / BORING". Her head moves horizontally in rhythm with her signs. Her facial expression is emphazising her utterance - that she can not find the pearls she wants to have.

A fourth girl, Ellen, enters the room. Ellen is 6:4 years old and deaf. She has very recently joined the other children's group. This was the only time she was observed from video recordings. She starts watching the ongoing conversation. Nick touches Karen and signs to her: ELLEN (he points and looks at Ellen, then turns back to Karen) THINKS YOU ARE SILLY". Karen answers him by making a waving movement with her right hand index finger and a head shake; "NO - WRONG". She turns to Ellen and shows her some pearls that she is holding in her

hand. When she withdraws and turns back to her work, all of the children, except Ellen, follow in her movements. The four children are now standing close to the table. Ellen walks around the table and takes a position at the other side.

The children work with the pearls again for a short while. Then Nick contacts Judy by touching her. When he has got her attention he signs; "K-A-R-E-N ISN'T NICE" and he shakes his head. He repeats his remark and then asks Judy; "DO YOU THINK SO?"

Judy looks at him, nods her head as to confirm that he has made his point clear, but then she turns around in a distinct body movement, as if she did not want to know anything more about his opinion about Karen.

Description of the second interaction

After a while it is time to tidy up. Many of the pearls have fallen down on the floor and Judy and Karen are seated at the floor, picking up the small pearls. Nick is sitting on a chair at the table. He leans forward and touches Judy's hair with his finger. When he gets her attention he makes a new comment about Karen; "IS SHE (really) NICE?"
Judy answers with a headnod; "YES SHE IS NICE. YOU SHOULD INVITE HER TO THE PARTY". Nick replies that he thinks Karen is "STUPID".

Judy turns to Karen, touches her and gets her attention; "YOU ARE NICE - YOU WILL COME TO THE PARTY" Karen shakes her head "NO".
Nick looks at Judy and signs; "SHE DOESN'T WANT TO".

Judy starts to explain to Karen what Nick has at home: a rabbit "A RABBIT A SMALL SWEET / when you / HOLD / him / YOU CAN FEEL /how / SOFT / and / NICE / he is /" Nick looks at Karen and makes a head nod: "YES I HAVE, I HAVE THIS BIG" - and he shows the size of the rabbit with his hands. "I HAVE - / come and have a / LOOK"

Karen gets interested and asks if Nick has anything else at home. But Nick shakes his head. He turns to Judy. "WHAT SORT OF PRESENT ARE YOU GOING TO BUY ME?" Judy shakes her head "NOTHING".

Nick is not content with this reply and signs: "YOU MUST ALWAYS BUY PRESENTS - EVERYBODY /shall buy presents/ TO ME". Judy's response to this request is to make Nick promise to buy her a present. "YOU MUST BUY ME A PRESENT WHEN I AM 7 YEARS. YOU MUST". Nick confirms with a head nod.

Comments

The three deaf children in focus of these two observations, discussed the ongoing play, but above all, they discussed other important matters of concern. Neither the structure of the dialogues, nor the content during the analyzed periods can be said to differ to any substantial extent, from hearing children's conversations at the same age.

The communication between the children was smooth. They made contact to each other primarily by means of touch and they waited to start a conversation until they had confirmed that the partner was watching them.

The children were involved in dialogues during most parts of the two analyzed periods, lasting 3:30 and 2:30 minutes respectively.

When in dialogues, the children used formal signs with nouns, verbs and adjectives as well as prepositions. Head movements were used for yes and no answers, but also as a reinforcement of a message, stressing the meaning of the utterance. Otherwise the children were not using nonverbal means of communication in dialogues as substitutes for formal signs. Rather the nonverbal means of communication was used as an enhancement, a reinforcement to the signs.

VIII.3 Description of interactions for deaf children with late sign language experience (the LSL children)

For ten of the fifteen children participating in this study, sign language was introduced when they were three and a half years old, or older. Until sign language had been introduced, seven of these ten children had been subjected to oral/aural training from the time of the diagnosis of a hearing impairment.

The analyses of the interactions to be presented in this section, showed that the children with late sign language experience mostly participated in communication with other deaf children in terms of attention to partners' activities, imitations, synchrony in body movements, joint attention and contact initiatives.

Many of the LSL children's contact initiatives were not sufficient to stimulate a response from the partner. The children frequently used speech sounds or vocalizations to call their partner's attention, and without checking that the partner was actually looking at them.

When the children were involved in dialogues, the dialogues were characterized by being short and simple in linguistic structure and not elaborated. These dialogues usually contained only one turn, i.e. one child made a comment, and the partner gave an answer to this comment. This answer was often only a "yes" or "no" answer.

The content of the dialogues between the deaf children with late sign language experience was, almost without exception, about the "here and now". In the very few cases when a child tried to comment on the past, the partner did not seem to understand the message.

Several of the LSL children relied mostly on nonverbal expressions in communication, as gross, sometimes exaggerated body movements, gestures and facial expressions.

The observations and analyses of the deaf children with early sign language experience presented in section VIII.2 showed that these children were sensitive to their partner's actions and reactions. This was not the case for many of the LSL children to be presented in this section.

VII.3.1 Playing a game: Two LSL children
Interaction no 3

The first description of an interaction between deaf children with late sign language experience is between two children, a girl aged 5:11 and a boy aged 7:0. The girl, Susan, has already been presented, when in interaction with an ESL child Lisa (section VIII.2.5). The boy Fredric, has a profound hearing impairment, discovered when he was one year old. His parents have persistently used oral training and considering the profound hearing impairment, his speech development is impressive.

During his first years, Fredric attended a day care center for hearing children. When he was four, he was moved to the kindergarten where groups of deaf children were placed, since his social behavior caused concern.

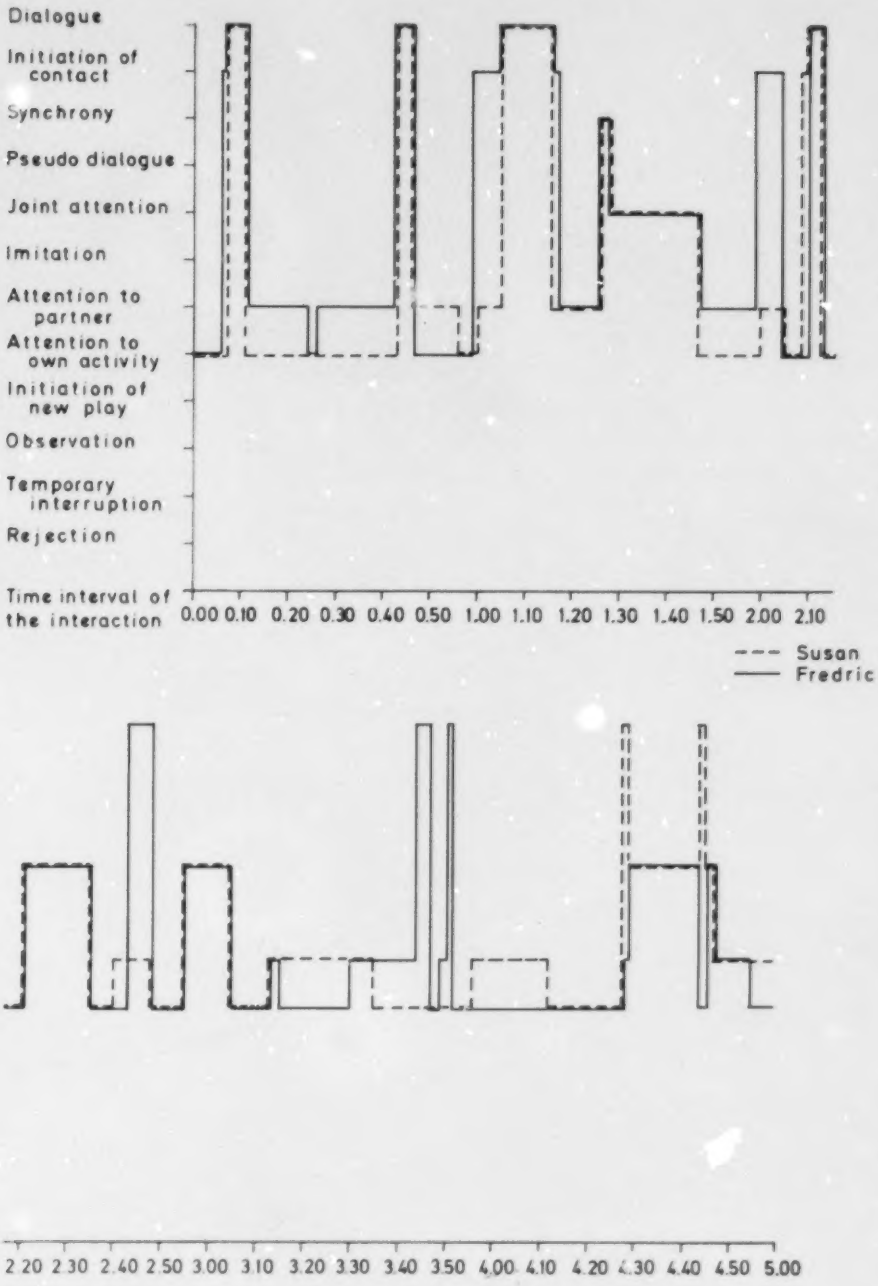
When Fredric started kindergarten he had primarily relied on speech in communication. When he was six years old, the teacher and the parents started to use signs regularly in their communication with the boy. The reason was that it had been discovered that Fredric could not communicate with the other children at the kindergarten. The deaf children could not hear what Fredric tried to say and he was also difficult for them to lipread. Fredric did not understand what the deaf children were signing.

The hearing children had great difficulties in understanding Fredric's speech and Fredric could not hear what they said. It was found that Fredric could only communicate with adults - with the teachers and the parents. Detailed analyses of their interactions revealed, however, that there were often misunderstandings between the teachers and the boy. At first Fredric was rather reluctant to using signs in communication. But when Susan joined the same group of deaf children as Fredric belonged to, he started to use signs. It had been observed that Fredric was very attracted to Susan.

When the two children are about to start playing a game named the "mousetrap", a video recording was made that was transcribed and analyzed. This game consists of a wooden frame with a horizontal bar attached to a strip. Lots of wooden markers are placed within the frame. When all the markers are inside, the bar is let loose, pressing all the markers together. The task is to pick up the markers, one by one, without moving the bar. When it moves it is the next player's turn to play. The player with the most amount of markers, is the winner.

The graphical representation of the analyzed period, figure 7, shows that the children either were attending their own game or watching the partner most of the analyzed period. There were several contact initiatives between the children and they were also engaged in dialogues a couple of times.

Figure 7. Phase-flow diagram of the interaction "Playing a game."



Description of the interaction

Susan and Fredric are seated at a circular table, with the teacher and a third deaf child, Carl, on their left side. The camera is primarily focusing Susan and Fredric. Carl will be presented in an interaction with another LSL child, in section VIII.3.8.

Fredric initiates or tries to initiate contact 7 times during the analyzed period. Three of these are responded to by Susan, resulting in joint activities or in a dialogue. In these cases Fredric uses bodily contact or gaze to establish contact. The remaining 4 initiations of contact are not successful. In these cases Fredric uses speech or vocalizations to call Susan's attention without looking at her to assure that he has her attention.

There are 4 dialogues between the children. They all have a very similar pattern:

1) - It is Susan's turn to play. She looks at the frame. Fredric touches her with his left hand on her arm, gets her attention and signs: "LOOK FIRST / you take these / TWO / then you take that / ONE". Susan looks at him, nods and signs "YES". Both Fredric and Susan sign without using their voices.

2) - It is Fredric's turn to play. When he has picked up a couple of markers, he looks at Susan. Susan looks back and he makes a "strong" gesture with both hands and arms high up in the air.(This is a gesture that Fredric uses frequently). Susan points at his markers with her finger and with a slight movement forwards with the head. Fredric proceeds his work.

3) - Susan starts to count her markers. She uses her fingers while counting. She counts her markers one by one and gets the sum of "SIX". She turns to Fredric, holding her "SIX"-hand in front of him. Fredric looks at her and nods "YES".

4) - Susan fingercounts her markers from one to nine. She looks at Fredric, vocalizes and hits the table with her fist. Fredric looks up and their eyes meet. He signs "THE SAME" and then start to play again. (They now have the same amount of markers). Susan smiles. She hits the surface of the table with her fist a second time.

Comments

The analyses of this interaction showed that the two children primarily used nonverbal expressions in the dialogues, as pointings, and other hand gestures, head movements and smiles. The four dialogues in this interaction were of the same character: one child - either Fredric or Susan - made a comment and the partner confirmed that the message had been received. Neither of the children elaborated the topic. The content was only referring to the "here and now".

VIII.3.2 Lack of mutual understanding I.: Two LSL children
Interaction no 5

When a new semester has started, Susan has a new friend at the kindergarten. It is a girl, here named Lena.

Lena has been deaf since she was born. From the age of two years she has attended a day care center where an oral/aural approach has been taken to communication. Sign language was introduced when she was four and a half years old. Lena, now 6:8 years old, has a substantial vocabulary of signs, but there are still doubts about her communicative competence.

During this interaction, which lasted 5:20 minutes, there was a dense pattern of interaction between the two girls.

Description of the interaction

When the observation starts, Susan and Lena are about to make patterns of indian pearls on a plastic frame.

During this interaction Lena contacts Susan 11 times, always by means of bodily contact. She succeeds in starting a dialogue or a joint activity in all but 3 of these efforts. One of these 3 last mentioned contact initiatives are responded by a looking-back behavior, while two are not responded by Susan. These last initiatives are the ones where Lena does not make sure that she has her partner's attention. Susan contacts Lena 5 times and gets her attention in all but one. Susan uses bodily contact in some of her initations of contact. She gets Lena's attention in all of the cases.

Both of the girls are using many different facial expressions, while communicating, as wide open mouths, sometimes showing the tongue, and wide open eyes. Their facial expressions alternate between exited and questioning.

They vocalize frequently. There are in all 9 dialogues between the two girls during the analyzed period. In 6 of the 9 dialogues, the structure is very similar: one child makes a comment and the partner gives an answer. In these 6 dialogues there was only one turn.

An example:
Lena touches Susan and the girls look at each other. Lena signs: "DIFFICULT". Susan leans forward and shows Lena how she ought to do, by pointing out the "right" pattern slightly above the frame. She signs "NOT DIFFICULT".

The remaining 3 dialogues have 2 turns: one child makes a comment, the partner answers,and the first child confirms.

An example:
Lena touches Susan repeatedly and starts to pull Susan's arm. Finally she gets Susan's attention and signs "NOT RED THERE" and points at her own pattern. She raises her index finger upwards, and her whole body raises as well as she continues: "I UNDERSTAND". Her mouth is wide open. She hits the table with her fist twice. She starts to make diagonal pointings at the pattern and then looks back at Susan.

Susan has been following the movements of Lena, by moving her head in the direction of Lena's pointings. She now nods her head "YES". Lena signs "YES" with her left hand and starts to put the pearls in the new order.

The content in all of the 9 dialogues are referring to the "here and now", except one, when Susan is telling Lena about how she worked before, (when she belonged to another group at the kindergarten and they made patterns of indian pearls).

Lena looks at Susan's work. Her mouth is wide open and the tongue is protruding. She touches Susan and shakes her head: "NO / you are not doing it right/".
Susan replies "/I have done/ THE SAME BEFORE" and she repeats "THE SAME". She uses her voice when she signs. Susan returns to her work.

Lena keeps looking at Susan's work. Her lips are apart. Susan repeats a second time "THE SAME", without looking up at Lena. She draws a diagonal line on her frame then she looks up at Lena. Lena responds by shaking her head and her left hand: "NO". She leans forward, takes a look at all the pearls and picks a new one. Susan repeats "BEFORE" but Lena is not watching her. This last statement is followed by Susan making a startling movement with the body and face. She leans over towards Lena's frame, points at it, shakes her head and signs "WRONG" /not red there/". Lena alters the position of one

pearl on the frame. Susan signs "RIGHT" and starts to work with her own pattern again."

Comments

Towards the end of the interaction, Lena was distressed over the way Susan worked. Susan was used to working with this material from her earlier preschool group at the kindergarten and she told Lena that she had done this before. This comment, referring to something in the past, was not understood by Lena. Watching her facial expression one found a big question mark in her face. Susan repeated her comment twice, but this was not enough to make Lena understand. A couple of minutes later when a hearing child has joined the children and analysis of the interaction has ceased, it can be seen on the monitor how the same subject came up again. This time Susan elaborated her explanation a bit further, by both making the sign BEFORE and pointing upwards - towards the second floor. But still Lena did not understand.

After the first instance when Lena did not understand what Susan told her, Susan changed subject, making a comment on the way Lena worked. The changing of subject can be interpreted as a strategy of solving the problem of Lena not understanding. This solution made her avoid having to explain something that Lena did not understand and that Susan herself probably lacked the means of explaining.

Both girls used a variety of nonverbal means of communicating as substitutes for formal signs. These nonverbal behaviors were often gross and exaggerated and out of proportion to the content of the communication. They overacted quite a lot.

VIII.3.3 The planning of a play - and the result:
Four LSL children
Interaction no 10

Susan and Lena belonged to a group, where there were two other deaf children, a boy named Billy and a girl named Margaretha. Billy was almost four years old when his deafness was discovered and diagnosed. Discussions with Billy's parents about the late discovery reveal that Billy from an early age was very competent in communicating although he did not speak. He always seemed to understand what the parents explained and expressed. His parents could easily understand Billy's needs and desires. Both the father and the mother have a very expressive way of communicating, both relying on many nonverbal expressions. This well-developed mutual understanding between parents and child is probably the reason for the late discovery.

When Billy was four years old he joined a deaf group at the kindergarten for deaf and hearing children. At this time teachers and parents introduced signs when communicating with the boy. Billy has never been subjected to oral/aural training.

The girl, Margaretha, is also deaf. Her parents long insisted that the child was hard of hearing and needed oral/aural training. Sign language was finally introduced at kindergarten when Margaretha was 5:5 years old. The parents, however, have been rather negative to sign language and it is doubtful whether Margaretha ever has had access to any substantial linguistic communication at home.

The following description is an example of an interaction between deaf children with late sign language experience. The children were discussing and planning a new play. Susan is now 6:8, Margaretha 6:7, Lena 7:0 and Billy is 5:2. The discussion is primarily between the three girls.

The analyses of this discussion indicate some of the difficulties for deaf children with late sign language experience and with little knowledge of how to communicate to reach mutual understanding.

Description of the interaction

Before the girls start planning the play, Billy and Lena are left alone in the play room for a short while. During this interval Billy tries to contact Lena several times, by means of gaze, touch, vocalizations, pantomimics, signs and actions. But Lena is not interested. She does not look at the boy, in spite of his efforts. She even rejects him physically twice.

There is one dialogue between the two children. It starts by Billy trying to contact Lena repeatedly by touching her. Lena does not answer him however. Not until he takes a toy that she considers belongs to her, she reacts by telling him off: she pushes away his hand and signs "NO". Billy looks at her with a questioning face and signs "NO?"/ -"You are supposed to be/ THE BABY" Lena signs and makes a distinct head movement towards Billy as an emphasis to the message.

At this moment Margaretha returns. She catches sight of Bill, and signs to him, making an extended open arm gesture. "/You are supposed to be / THE BABY". Billy makes a hand gesture, indicating "NO" and he shakes his head. Lena interferes and takes a firm grip on his shoulders and makes him go down on the floor.

Now Susan enters the scene. Billy approaches her and they start to play: they move their bodies and arms, looking out at the next room. They make believe that they are frightened and upset about what they see. But this fantasy play between Billy and Susan is soon interrupted by Lena. She approaches Susan, welcomes her back to the group and shows her where she has planned to have a party:

/we can/ EAT CAKE THERE" she signs and points towards the corner of the room where Margaretha is waiting and she adds "/We are going to have/ A PARTY". Susan looks in the direction of Lena's pointing and walks off in that direction. There is no other answer.

All of the children are now together. Lena starts the planning discussion. She approaches Margaretha. She touches her body by holding one hand on Margartha's cheek and the other on her shoulder. Margaretha looks back and Lena starts to sign. Lena uses very distinct hand movements and she is looking Margaretha right in the eyes. "YOU AND I / shall make / CHRISTMAS PARCELS". She looks very determined. (She obviously wants to persuade Margaretha to play the game, according to her rules.) She ends the sentence with a head nod, her head is also slightly tilted. She uses lip movements when she signs, but no voice. Margaretha shakes her head, her lips apart: "NO / I want to play / OUT THERE" and she points towards the garden outside the window.

Lena turns to Susan, who has been watching Lena and Margaretha. Susan now looks back at Lena, then turns to Margareta and repeats part of what Lena just signed: "YOU/ shall make/PARCEL, YOU" and she nods her head "YES". Margaretha answers "OUTSIDE - STOP YOU" and she points at Susan. (Susan acts as an interpreter between Lena and Margaretha, but Margaretha is not convinced.)

While Lena and Margaretha are still in dialogue, Lena interrupts by taking a firm grip around the waist of Susan and she moves her away from the place where she has been standing. Susan looks bewildered, turns around and signs and vocalizes to Lena to stop. Lena shakes her head "NO".

The three girls gather together. They are standing opposite each other, Lena at one side and Margaretha at the other. Billy is standing a bit apart from the girls, watching them and holding a small teddy bear in his hands.

The girls are now involved in a discussion about the play. Lena and Margaretha are signing at the same time (without consideration that each has to take her turn). Lena addresses Susan, while Margaretha tries to make her point of view clear alternately to Lena and Susan. Susan is standing in an akimbo position with a tilted head and she answers Lena but mostly ignores Margaretha. The interaction is illustrated graphically in figure 8a, 8b and 8c.

The discussion between the three girls ends by Susan looking at something in the other room. The two other girls follow her direction of gaze and the dialogues are broken. Lena tries several times to get Susan's attention and to start the conversation again about planning the play, but Susan ignores her by avoiding eye contact and finally she leaves the room. The interaction ends in Susan and Margaretha playing by themselves and Lena by herself with Billy at her side. They play in the same room however.

Figure 8a. Phase-flow diagram of the interaction "The planning of a play": Susan and Lena.

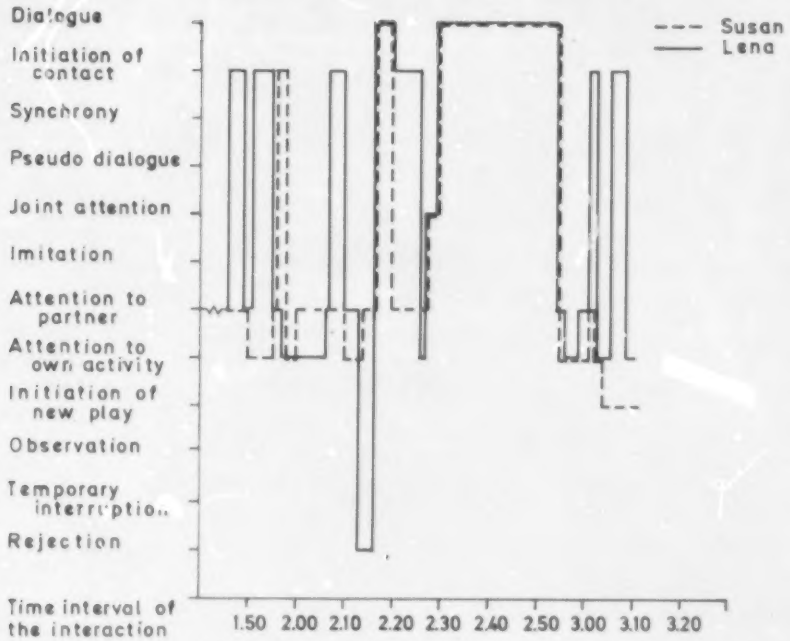


Figure 8b. Phase-flow diagram of the interaction "The planning of a play": Susan and Margaretha.

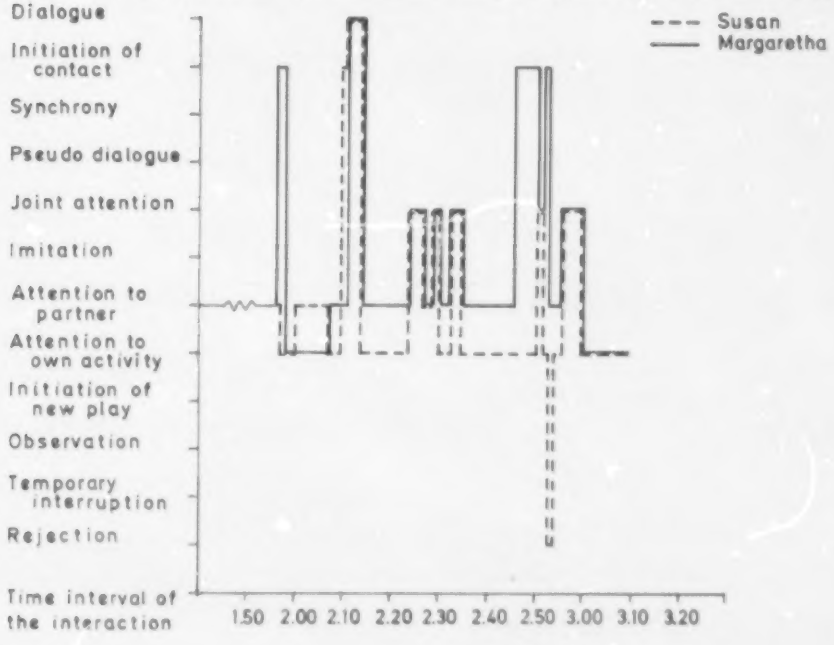
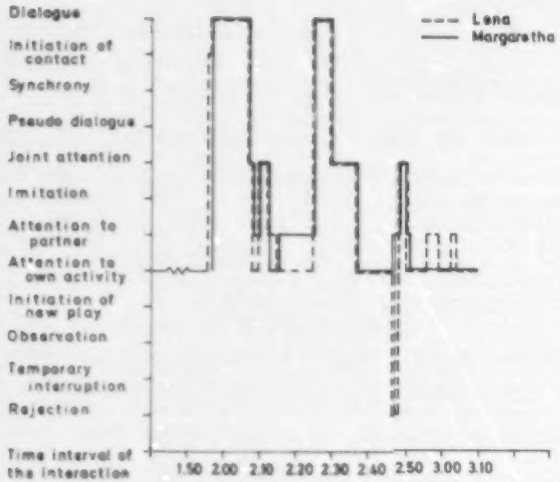


Figure 8c. Phase-flow diagram of the interaction "The planning of a play": Lena and Margaretha.



Comments

The analysis of the dialogues during the observed period showed the same pattern as the ones earlier described in this section: One child made a statement, while the partner gave an affirmative or a negative answer. The dialogues had only one turn and there was no elaboration of the first statement.

Lena intended to have the play her way. She interrupted the other children's activities, she held them in a firm grip to assure of having their attention and she even used physical strenght in her persuasions.

In spite of Lena's efforts to persuade Susan to join in the play, planned and organized by Lena, Susan did not follow. She had other plans and she did not take orders from Lena. Lena is a dominant girl, but she did no succeed in her attempts to be the leader of the group.

What was at first considered to be a dense pattern of interaction turned out - after detailed analyses had been conducted - to be short dialogues where the children at several instances were signing at the same time without considering that each had to take her turn.

The content of the dialogues had the characteristic of a quarrel rather than a discussion. Lena had her idea about how this play was to be performed, while Susan and Margaretha had an opposite opinion.

Susan knew how to neglect contact from a partner. Instead of looking at the partner, Susan looked in a different direction. This gaze behavior seem to be a very effective way of breaking an unwanted or an unpleasant communication.

VIII.3.4 Lack of mutual understanding 2: Three LSL children
Interaction no 16

When Billy is 5:5, Susan 6:10 and Margaretha 6:9 we observe them again. This time the children are working with making small clay figures. 4:0 minutes of interaction were analyzed.

During this sequence, there is a dense pattern of interaction between the children, especially between Susan and Margaretha. The two girls contacted each other frequently. But in several instances when one child started to tell the partner something, the partner misunderstood or failed to understand what the child was referring to and there was a breakdown in communication. There were dialogues registered between the girls, but also a pseudo dialogue.

Description of the interaction

When the observation starts, Susan points at something placed in the window at her right side. Margaretha follows her pointing and the girls then look at each other. Susan starts working again, while Margaretha is still looking at the object in the window.
She has a questioning facial expression.
A moment later, Margaretha watches Billy when he starts to work, and so does Susan.
Susan then turns her head towards Margaretha in a very distinct movement. (This head movement is interpreted as an invitation of contact.)

Margaretha signs to Susan "WHAT-A-MESS", referring to Billy's way of handling his clay. Susan looks down at her own work, while Margaretha watches her for another few seconds, before she starts to work again.

There was a pseudo dialogue between the children.
The following happens.
In the room nextdoors, the hearing children are playing. Susan touches Margaretha by the arm and points towards the next room. She looks almost frightened. Margaretha follows her pointing. Susan turns back to Margaretha, holding her left hand towards the mouth "/ how dreadful/".

Margaretha does not look back at Susan, and Susan touches her again. This time she touches at Margaretha's cheek to get her attention. When she does, she starts to sign, with slow, almost dramatic movements. "FILTHY" she signs and her tongue is protruding from the mouth.
Margaretha points at herself and her body position is slightly backward. "ME, ME?" she asks.

But Susan does not refer to Margaretha, but something that happens in the other room. Susan signs once again: "LOOK, FILTHY I DON'T-LIKE / that /". She looks and points out at the room nextdoors and Margaretha follows her pointing gestures with the eyes. Again, Susan touches Margaretha and repeats the comment "FILTHY". Margaretha follows Susan's pointing but she makes no other visible response. The two girls start to work again.

Comments

There was a lack of understanding between the two girls at several instances with breakdowns in communiction as the consequence. When the children did not reach mutual understanding or sharing of meanings, the communication strategy was to leave the subject. For example: Susan made no efforts of trying to explain more throughly what she meant by pointing at the window. Instead she returned to her work. Margaretha did not pose any further questions to clarify what Susan meant.

When Susan made a very distinct head movement towards Margaretha after both had been observing Billy, Margaretha answered this by making a comment on Billy's behavior. Susan did not answer, however, but looked at her own clay figure and started to work again. In a smooth communication, Susan would have been expected to respond to Margaretha's comment.

The structure of the dialogues was the same as in the earlier observations of dialogues between deaf children with late sign language experience: One child made a comment, while the partner gave a "yes"or"no" answer. The dialogues were short and not elaborated. They only concerned the "here and now".

During the pseudo dialogue, Margaretha refeired Susan's negative comments to her own person, in spite of Susan's repetitions. This time Susan seemed to really want Margaretha to understand what

she had in mind. But Susan only repeated the message, she did not modify it, using other signs or expressions that Margaretha maybe could have understood.

Transcriptions of Margaretha's behaviors and expressions did not indicate that she had understood.

VIII.3.5 An interaction between children not sharing a linguistic code: Two LSL children
Interaction no 19

When the three girls, Susan, Lena and Margaretha started school, Billy was the only deaf child in his preschool group. The other children were hearing or hard of hearing.

The following observation was made when Billy was 6:0. It is an example of an interaction between a deaf child, used to communicate by means of expressive gestures and signs, and a hard of hearing child, Maria now 5:0, who does not command the rules of communication or the rules of social interaction. Maria was presented in section VIII.2.3 when she joined an ongoing play between deaf children with early sign language experience.

The observation of the two children showed that there was almost no joint activity between them. They were working with the same material, seated next to each other, but this was all they had in common. This lack of communication between a deaf child and a severely hard-of hearing child has been observed at several times during the research work in the longitudinal studies of learning processes and personality development. (See for example Nordén, Preisler and Heiling, 1979; Preisler, 1979).

Description of the interaction

Billy and Maria are in a group of hearing children. They are making dolls, using round white balls that they put on top of

a long stick. They have pieces of papers that they paste on the head of the dolls as a cap. They paint the eyes and the mouth with a pen while the nose consists of a small piece of cork.

Billy and Maria are seated at one side of a circular table. Billy has a hearing girl at his right side. One of the teachers is sitting face-to-face to Billy and Maria.

Billy is working with concentration, looking at what the other children are doing every now and then, but without interrupting his own work. When he has put the painted head on the stick, he "walks" with it, showing the teacher what he has achieved. Maria, who is also working with concentration, looks up when Billy and the teacher are in conversation, otherwise she is mostly directing her attention to her own work.

Billy plays with his stick, he moves it up and down several times. He moves it towards Maria and touches her very lightly with the end of the stick. She makes no noticable response to his small contact initiative. This was the only invitation to play from Billy to Maria.

Towards the end of the analyzed period, Maria makes one, very rapid contact initiative towards Billy. It is proceeded by Billy calling the attention of the teacher by means of vocalisations and pointings towards the material he has in front of him. He has some difficulties in fastening the cap on the doll. The teacher shows him how to do. Maria is watching the teacher and Billy during this interval. When the teacher has shown Billy, she leaves him. Now Maria leans slightly forward, points at Billy's material and vocalizes "uhhh". Obviously she wants to tell him something. Billy does not notice her contact initiative and Maria withdraws rapidly to her own work. Maria is not watching Billy's face to assure herself that she has his attention.

This interaction has been presented graphically in figure 3, page 116. As the figure illustrates, the only time the two children are in communication is when both turn their attention to the teacher.

Comments

When these two children wanted to express something or comment on the situation, they both turned to the teacher. She was during this observed period the only person that had command of both signs and speech and thus able to understand Billy and Maria, respectively.

Billy and Maria were not sharing a linguistic code. Billy, who mainly relied on signs in communication could manage quite well when playing with hearing children at the kindergarten, as Billy was a boy who knew how to communicate. He used pantomime, pointings, head movements and body gestures when involved in play situations with hearing children.

The scene where Maria made a contact initiative towards Billy passed very quickly. When observing and transcribing this part of the interaction we were struck by the thought that perhaps Maria did not expect Billy to answer her. Maria was not used to communicate with other children in terms of sharing meanings, understanding the intention of other children's actions and verbalizations or to transmit messages that others responded to.

Maria did not manage to interact neither with deaf nor with hearing children, as she did not command the rules of communication. Maria primarily relied on vocal means of communication, a code she partly shared with the hearing children. But she did not know how to wait for her turn, how to play with toys together with other children, how to be attentive to what the other children said or did. Observations of Maria in many different social settings at the kindergarten indicated that she had great difficulties in social interactions with other children.

The next example is another illustration of Maria's lack of knowledge of the rules of communication.

VIII.3.6 Lack of knowledge of the rules of communication: Two LSL children
Interaction no 20

When the children have finished making their dolls, Billy and Maria start to play in a small play room nextdoors.

The analysis of this observation is but a further illustration of the difficulty for two children to communicate, when one of the children is unaware of the elementary rules of communication in social interaction.

Description of the interaction

Billy is leaning over a doll's pram where he is about to put his self-made doll, when Maria approaches. She taps his arm repeatedly, withdraws, looking at her own doll, that she holds in front of her. She signs and says "LOOK", then she runs off. She starts moving around in the room. She walks with big steps and she vocalizes in a way that almost sounds like singing. She is making a "show" for Billy.

But Maria has not made sure that Billy is observing her - and he is not. She turns around and when she finds out that Billy is pushing his doll's pram in a direction away from her and is not attending to her "show", she stops moving around and walks off.

(This was the first example during this interaction of Maria's lack of knowledge about essential features in communication with deaf children - to have their attention before a communication can start.)

A moment later Maria returns. Soon afterwards one of the visiting parents (not Maria's or Billy's) enters the room. Maria contacts her. She approaches the adult, pushes her down on the bed, points at her and signs "THERE LAY DOWN". The adult sits down and asks "WHAT ARE YOU GOING TO DO?". Maria does not reply, she turns around and fetches a doctor's kit.

Billy has been watching the adult and Maria. He now approaches Maria. He looks down the kit, that Maria is holding. Maria immediately pushes him off. She then leaves him and joins the visiting parent. She starts to examine her with a stetoscope. Billy is soon by her side and they both take part in the medical examination.

A closer look at their play, reveals that the children mostly turn their attention to the adult and not to each other. However, Billy tries to comment on the play:
He touches Maria's arm several times. Finally he gets her attention and starts to sign "YOU / are / THE MOTHER, I / am / THE FATHER". He ends the sentence with a head nod as a reinforcement of his utterance. Maria looks at him, but she does not answer. Instead she turns her attention to the adult again.

Billy signs very carefully and slowly. He uses signs that Maria knows. But she does not respond to this simple and short message. (It is doubtful, watching her facial expression, that she has understood the meaning of the utterance.)
For Billy this is a role play, where each participant has a role. This he wants to communicate to Maria. Maria's play concerns the "here and now" and she is not taking part in his role play.

When the children have been making the medical examination for quite a while, Maria fetches new instruments. Billy looks bored. He has tried to communicate and to play with Maria, but without success. Now he tries again, using pantomime and

big actions to get her attention: Maria leaves the bed and fetches some new instruments from the kit. Billy walks up to the table where the kit is placed, puts down the thermometer. He looks rather gloomy, looks at Maria, falls down on the floor, with his arms and legs stretched out. Maria exclaims "ahhh", followed by the words "he died".

Maria notices Billy, but she directs her comments to the adult. She starts to play again, not paying attention to Billy. Billy, still lying on the floor, calls her attention again,by vocalizations. Maria looks at him - at least she notices him. Billy starts to sign "LOOK-AT-ME LOOK-AT-ME", but Maria turns her head back too soon to notice the whole sentence.

Billy gets up on his feet. He holds his hands and arms stretched out from the body in a big gesture. They are signalling the message: "Look at me, here I am". But neither the adult nor Maria pay any attention to Billy. He now makes his final effort in reaching Maria, by starting to fall backwards in gross body movements. Maria looks at him with a blank face. Billy looks at her, makes a distinct headnod, turns around and walks off.

The medical examination is soon over and Maria and the adult leave the room. Billy has been standing a bit apart. He now follows, holding his self-made doll in his hand.

In spite of Billy's efforts to try to establish contact and to communicate with Maria, he did not succeed in reaching her. He uses signs, vocalizations, gross body movements, gestures and even speech, but with no result.

Comments

The boy, Billy, in this description of an interaction between two children not sharing a linguistic code, made repeated efforts of

communicating with his partner. In spite of his efforts and a variety of communicative behaviors, his partner did not answer, although his efforts were observed, i.e. there were no communication between the children. The reason why the partner, Maria, did not answer could be explained as either because of her not being interested or because of her not fully understanding Billy's intentions. Observations of this girl in interactions with other children, both hearing and deaf, makes one favor the second explanation - that she did not understand what Billy wanted to tell her.

Transcriptions and observations of Billy's actions and reactions in this interaction and in descriptions of interactions where he participated and referred to in earlier sections, have revealed that this boy was a child with substantial knowledge of the rules of communication. He was attentive to his partner, he waited for his turn in dialogues and in joint activities, he modified his way of communicating in order to adapt to a partner's possibilities to understand etc.

Both of these two children, Billy and Maria, had late sign language experience. The difference between the two was that Maria had a less profound hearing impairment and had been subjected to oral/aural training. Billy,on the other hand, was deaf and had never been subjected to oral/aural training, but had been used to communicate with parents and others by means of gestures and other visual means of communication until signs had been introduced in communication.

VIII.3.7 <u>This is only for fun - or isn't it?: Two LSL children Interaction no 6</u>

In several interactions between the deaf children, a body gesture consisting of rapid movements with one or several parts of the body, was identified and interpreted as having the meaning "this is only for fun" and not to be taken seriously. The body gesture

was frequently registered and in most cases understood by the partner, as what could be seen from the outcome of the children's play.

But the body gesture was not always understood or interpreted by other children as having this specific meaning, as the following description will illustrate.

The interaction to be described is between Eric, now 6:10 years old and Johnny 6:7 years old. Eric has already been presented in interaction with Susan and Lisa.

Johnny is hard of hearing and he has been orally trained. In spite of Johnny's moderate hearing impairment, his speech is difficult to perceive. There are often misunderstandings in the communication between Johnny and the other children in the group of children he belongs to. Johnny was placed in this kindergarten as there were severe doubts about his social, as well as his cognitive development. Observations of Johnny in different situations showed that Johnny performed socially and cognitively much below what would be expected of a boy at his age.

Description of the interaction

Eric and Johnny have been playing in one of the playrooms and it is now time to tidy up before leaving the kindergarten for the day.

Eric moves around the room. He neither walks nor rans, rather jumps around in a playful manner - he laughs and smiles as well. Johnny does not respond to Eric's behavior - that what is about to happen is for fun. Eric approaches Johnny, he smiles and laughs and takes Johnny's hands. Johnny rejects Eric's invitation of contact. He yells, whines and pushes away Eric, without looking at him.

During almost two minutes, Eric tries repeatedly to invite Johnny to play. Johnny rejects him repeatedly, by pushing him off. Eric starts to wrestle with Johnny. He laughs and there is no sign of tension in his body movements. Johnny hits Eric with hard punches. His facial expression and his whole body is tense. The interaction ends by Johnny running off, leaving Eric alone.

Comments

Eric started to "invite" Johnny to play, by jumping around laughingly, telling Johnny that "this is only for fun". But Johnny answered Eric by pushing him off.

When the boys got involved in a physical encounter, it was a wrestle for Eric, but a fight for Johnny. This could be read from the boys postures and the facial expressions of the boys: Eric was smiling and his body movements and his body posture bore no signs of tension. Johnny on the other hand was tense in his body, and he hit Eric with hard punches. His facial expression was very tense and he looked angry. There was no doubt that he was involved in a fight with Eric, while Eric was wrestling. The two children were taking part in an interaction with different meaning.

A very similar situation happened just a minute after Johnny had left the room and Carl,a deaf boy of 6:4 years, entered.

VIII.3.8 Understanding, but not agreeing: Two LSL children
Interaction no 7

Carl became profoundly deaf at an age of two and a half, after a meningitis. At this time, Carl has already started to use speech and to communicate with vocal symbols. Now, when Carl is over six years old, he speaks and he understands spoken language remarkably well in communication with one child or with one adult at a

time. But sign language has been introduced to Carl as a means of communication when vocal symbols are not sufficient, for example when participating in large groups of children. Carl has never been orally trained.

What happened in the following situation was that the two boys got involved in an interaction of much the same character as the one between Eric and Johnny. The difference was that this time the play had the same meaning for the children.

Description of the interaction

Carl makes a big jump over a folded carpet in the play room and is now shown in the monitor. Eric is quickly by his side, trying to push him. Carl takes a firm grip round Eric's body and pushes him back. Eric laughs while Carl has a more neutral face.

Carl pushes Eric down towards the floor, then raises quickly to an upright position. His body posture is straight and he makes an impression of being powerful and strong. Eric tries to get Carl involved in his wrestling match, but Carl is not interested in wrestling. As Carl is somewhat stronger than Eric, he has no problems in telling Eric by actions that he is not interested in this game. But it is not physical power alone that has importance in this situation, rather his body posture and his body movements clearly tell Eric that Carl does not want to participate.

Comments

After a while Carl left the room and Eric. When Johnny left, it was an escape. Carl on the other hand, left with some dignity. He was not a looser as Johnny was, just someone who at this time did not want to play the same game as the partner. Although Carl did not want to participate in Eric's wrestlings, he was aware of the meaning of the play.

VIII.4 Hearing children's use of nonverbal and verbal means of communication in child-child interaction

The deaf children in interaction with other deaf children, were observed to use a wide variety of nonverbal means of communication, as semantic modifiers, substitutes for verbal expressions or as regulators of social interaction.

A commonly held view of the way hearing children communicate has been that the children use a lot of nonverbal expressions when they are young and have a restricted vocabulary of words. When verbal means of communication gets a more dominating role in interpersonal interaction, the use of nonverbal expressions in communication gradually diminishes.

When detailed studies of child-child interaction have been made, it has been found that some nonverbal expressions, as big body gestures and pantomimes are used less frequently but that less obvious expressions, as gaze behaviors, head movements, facial expressions etc play an important role in social interaction.

In an ongoing study of seventeen hearing children between 2:4 and 7:0 years of age, the children's display of nonverbal and verbal behaviors is studied by means of video recordings with simultaneous direct observations*. The video recordings started at the same time as the recordings of the deaf children and have been made in similar settings. The same system of transcribing and analyzing the results is being used. This will make it possible to make comparisions between the display of nonverbal and verbal behaviors by deaf and by hearing children.

As the work with transcriptions and analyses is still in progress, only preliminary results can be given now. The study of the hearing children will be presented in a doctoral thesis. The following results are presented here by the permission of Ulla Blohm.

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*) The study is conducted by psychologist Ulla Blohm at the Department of Psychology at the University of Stockholm. The study is finanzed by the Delegation for Social Research (DSF).

When the hearing children in the study were engaged in activities where they needed to look at what they were doing, like drawing and painting, they could at the same time be engaged in dialogues or in collective monologues without looking at one another other than occasionally. The younger children, between two and four years of age, more often tended to stop their ongoing activity to look at each other, especially if one child started to talk to the partner.

The older children did not seem to rely on visual turn-taking in dialogues as much as the deaf children were observed to do. The hearing children used other turn-taking cues, as pauses, pitch of voice, intonation etc. But as soon as the topic of conversation concerned something important, or if somebody raised a new topic of conversation they tended to look up and watch each other.

In interactions between the hearing children, the following behaviors were observed as having the function of initiating contact between the children: smiles, mutual gaze, head tilts, bodily contact, watching the partner's activity, imitating the partner's voice or actions, posing questions or making other forms of verbal comments. Bodily contact was a means of communication frequently used by the deaf children. This has not been observed to the same extent between the hearing children, which might be explained by the fact that they easily can contact a partner by speech or vocalizations. Playing with words*, in rhymhes, with a high pitch of voice or with new word combinations, seemed to have a special quality for the hearing children of five to six years of age, very inviting for the other children. The younger children also played with words but rather on the phonological level.

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*) Playing with signs has been observed among the deaf children in the longitudinal investigation (Nordén, Preisler and Heiling, 1979; Nordén and Tvingstedt, 1982; HÜlphers, in press), but has as yet not been closely analyzed.

The dialogues between the hearing children concerned both the "here and now" and also things and events outside the immediate situation. When discussing events outside the immediate situation, references to contents in tv programs was one topic that both the younger and the older children made frequently.

The hearing children used verbal means of communication in dialogues, but also a lot of nonverbal expressions, like hand gestures, body movements, body posture and locating persons and objects and events with the eyes. When talking about qualities of objects and events, the hearing children, especially the younger ones, used gestures, facial expressions, body movements or body postures as semantic modifiers.

Locating an object, person or event with the eyes is one characteristic of sign language communication (Bergman, 1980). Observations of the hearing children, both the youngest ones and the older children, showed that they often used localizations with the eyes.

A body gesture named "this is only for fun" has been described for the deaf children. This body gesture was also repeatedly observed in interactions between both the younger and the older hearing children. The hearing children were further observed to use a very special way of telling their partner the difference between fantasy and reality in plays.When they were talking to one another, especially in role plays but also in other play settings, they used shifts from the present tense to a past tense. The analyses of the content of dialogues showed that this shift indicated the borders between fantasy and reality. The past tense was used when the children were in the fantasy part of the play, while the present tense was used when the children referred to the present situation.

VIII.5 Summary and comments

The descriptions of the interactions for the children with early sign language experience showed that these children were aware of fundamental rules in social interaction. One of these rules, when you or your partner is deaf, is to assure yourself of having the partner's attention; that the partner is looking at you when you want to communicate.

Attention to partners

The deaf children with early language experience were attentive to other deaf children. They followed the partner's face and activities as if they wanted to be easily accessible to communication. (They were also attentive to adults - teachers and parents, though these interactions were not discussed in this study.)

When the ESL children wanted to communicate with a partner, they first "analyzed" the possibility of getting the partner's attention by looking at the partner. They would check whether it was suitable for the partner to get involved in communication. Both in joint activities and in dialogues, the children with early sign language experience, with very few exceptions, waited for their turn and did not interrupt ongoing conversations or ongoing play between other children. They also knew the significance of making a pause - an important rule in social interaction.

For the ESL children, there always seemed to be a channel open for communication with other children - and with adults. This was not observed to the same extent for deaf children with late sign language experience.

The orally trained LSL children could be observed attempting to contact a partner without looking at the partner to make sure the partner was willing or even able to start communicating. Interruptions of ongoing play were also observed among these children.

The use of nonverbal and verbal means of communication - in dialogues

When in dialogues with other LSL children, the children with early sign language experience used signs in communication accompanied by a sophisticated pattern of nonverbal behaviors.

Some of these behaviors were parts of signs: Typical examples were locating a person or an object with the eyes, pointing behaviors with the hands and eyes. Some of the nonverbal behavior constituted a modifier of an individual sign or a sequence of signs, conveying a more exact meaning of the sign or the sign sequence. Others were a part of social communication such as smiles, tilting the head etc.

The children with early sign language experience discussed matters that concerned the ongoing play - the "here and now" - as well as matters that were going to happen or events that had already passed. Fantasy and reality were dealt with as easily with verbal means of communication.

The deaf children with late sign language were mostly involved in "acted" conversations, rather than verbal dialogues. In those cases where there were dialogues, the children used signs as well as many gross and sometimes exaggerated nonverbal expressions. The latter were substitutes for formal signs. Furthermore, the dialogues between the LSL children were characterized by being short and simple in linguistic structure. The content of the utterances was only about the "here and now". There were cases observed when a LSL child used signs to tell another LSL child about a passed event. But, this was not understood by the partner.

The deaf children were observed in activities with other deaf children with similar sign language experience as well as in some encounters with deaf children with earlier and later sign language experience. The analysis of interactions between ESL and LSL children showed there were fewer dialogues registered than between solely ESL or solely LSL children. Joint activities constituted most of the communication between ESL and LSL children: they shared their interests with their partners through actions rather than formal sign dialogues.

The use of nonverbal and verbal means of communication - in contact initiatives

The analysis of the ESL children's contact initiatives showed that the children touched their partner's arm, hand or side of the body, or waved their hands in front of the partner's face to gain attention. In some instances only a change in body position, from an upright to a more forward-leaning position, was needed to get the partner to look up and make it possible to communicate. The type of contact initiatives used depended very much on the social context.

The ESL children never used only vocalizations to get a partner's attention. Yet, they sometimes used vocalizations in combination with gestures or other means of communication to initiate contact. This was especially the case in interactions with hearing impaired children, i.e. when initiating contact with children who could hear these sounds.

When the ESL children wanted to get the attention of a partner, they used bodily contact, a change in body movement and, also, vocalisations. It turned out to be the orally trained deaf children who started to vocalise or talk to their deaf partner without any assurance that the partner was paying attention. These contact initiatives went unresponded.

The way the ESL and the LSL children sought contact in mixed-group interactions was different from the strategy they used when seeking contact with a partner with a similar sign language background. When an ESL child sought contact with a LSL child, and vice versa, they used less bodily contact than when in interaction with children with the same sign language experience. Contact initiatives seldom resulted in dialogues, but rather in joint activities.

The use of nonverbal and verbal means of communication - in joint activities

In joint activities between the children, synchrony in body movements and imitations of partner's actions were registered. Synchrony in body movements were not transcribed in the present study when the children were involved in dialogues. In order to perform this type of analysis, other technical facilities than the ones used would have been needed.

But synchrony in body movements was registered in joint activities. Two different types of synchrony were identified. The first type of synchrony did not seem to have any communicative function - the children moved in synchrony to each other's actions, without looking at each other. However, there was a second type of synchrony in movement which was interpreted as an adaptation to a partner's actions in order to move in the same rhythm as the partner. This type of synchrony was in fact a communicative strategy in social interaction. It was registered for both deaf children with ESL and with LSL.

The children imitated their partner's actions in several play situations. Two different types of imitations could be identified. The first was interpreted as a way of understanding a partner's actions and did not have the function of being communicative. In the second type of imitation registered there was an intention from the child to communicate. This type of imitation was recognized as a way of joining or taking part in other

children's play. Imitation of a partner's movements or actions seemed to be a very rapid and uncomplicated communicative strategy for the child to say he wanted to join in play.

The play behavior "this is only for fun" was another communicative strategy displayed by the deaf children in joint activities. This behavior pattern was used by both ESL and LSL children, although not always understood by the LSL partners.

The specific functions of synchrony in body movements, imitations and the play behavior "this is only for fun" were not known in advance, but identified through detailed registrations and analyses of the videorecorded interactions.

Modification of communication

The way the ESL children communicated when in interaction with LSL children, compared to the way they communicated when in interactions with other LSL children, showed that the ESL children modified their way of communicating depending on the partner's communicative competence.

When the ESL children wanted to express something by means of verbal behavior to the LSL children, they modified their signs to help their partner understand. They signed with distinct and slow hand movements. The signs were usually accompanied by articulation or structured lip movements with speech sounds.

Modification of communication between the orally trained deaf children was not registered. There were incidences when one child tried to explain something to a partner, but without the partner understanding. The LSL child repeated the message, but without modifying it - and still the partner did not understand.

Communication is modified frequently, as was discussed in chapters III and IV, because one in some sense sees things through the perspective of another person. This ability, to take the perspective of another person in communication is acquired in

communication with persons who understand the child and who make themselves understood to the child, i.e. in interactions characterized by mutual understanding, reciprocity, intention and meaning.

Adaption to a partner in conflict situations

There were very few conflict situations registered in the study. However, the communicative strategies used by the children in these situations are worth mentioning.

In two interactions between ESL children, the children were very close to starting a conflict. The incidences were solved, however, by the children using verbal means of communication. These interactions are described in sections VIII.2.1 and VIII.2.6.

There were also conflict incidences between the LSL children and between LSL and ESL children. Two different communicative strategies were used in these interactions. The first strategy was to turn to an adult who could solve the conflict by slowly and carefully explaining to the children what and how to do. In interactions between an ESL and a LSL child or between LSL children, the children lacked the means of expressing themselves in a way that the other child could understand, as the children did not share a linguistic code. In spite of the ESL children's efforts to reach a mutual understanding, often the LSL children still did not understand. The LSL children had a restricted vocabulary of signs, especially the orally trained children, and relied primarily on speech sounds and vocalizations in communication. These expressions were not perceived and therefore not understood by the ESL children - or by the deaf LSL children.

The second strategy used by the LSL children in conflict situations was merely to escape from the scene.
If a child lacks the verbal means to explain to a partner when he does or what he does not want and why, other means must be used. In the interactions analyzed, two other means were used: turning to an adult who could act as an interpreter, and leaving the play.

IX. GENERAL DISCUSSION

The objective of this study has been to describe and analyze communicative strategies used by deaf children in various forms of social interaction with other deaf children. The descriptions were based on video recordings.

When I began this study, there was very little prior work on the nonverbal and verbal communicative behavior of deaf children. Thus I started with very few preconceptions as to which details of communicative behavior to look for. The situation I faced was somewhat like the situation an anthropologist can experience when studying human behavior in a foreign culture. Richard Sorenson, an American anthropologist, has described this situation in the following way:

> "Because the behavioral dynamics of the Fore proto agricultural way of life were not yet known, there was no way of knowing what was important to examine. As in any cross-cultural study, cultural blinders (blinkers) were a major problem. We cannot avoid the fact that we are all culturally conditioned beings with our own culturally specific patterns of awareness and understanding" (1979, p. 290).

Deaf children must rely on other means of communiction than those we, who can hear, use. Being hearing myself, I am culturally conditioned to "specific patterns of awareness and understanding". Cultural blinders have therefore, probably also been a problem in this study.

The approach followed in this study was the following. First, through repeated observation of videorecorded interactions between deaf children, important behavior units in communication were identified and a list of these units was constructed. Then, the deaf children's behavior was transcribed, second by second. From the detailed transcriptions of the children's behavior, different phases of interaction between pairs of children were

identified. The next step was to examine the children's behavior in terms of these phases. The phases became the main units used in the analysis of the children's communicative strategies. The last step in the analyses was to describe how the children acted and reacted in different social settings.

This detailed analytical procedure revealed some unexpected findings. In fact, many of the results in this study would probably not have appeared if I had decided in advance exactly what to look for. Thus, the experience gained in this study suggests that in order to determine what is of critical importance to observe, an explorative and descriptive study is essential.

The detailed observations and analyses of the children's behavior from the videotapes made it possible to register small behavior units. It was also possible to describe systematically the flow of interaction between two or more children in a way that would have been impossible by simply observing the actual situation. The small behavior units in the flow of interaction are of crucial importance in understanding communicative skills - or lack of communicative skills.

One impression conveyed by the transcriptions of the video-recorded interactions is that practically all behavior has meaning. This is also the impression gained from the observation of hearing children in child-child interaction (Blohm, under preparation), as well as from the study of deaf children in interaction with parents (Nordén and Tvingstedt, 1982; Hülphers, in press) and from the study of deaf children in interaction with teachers and peers (Nordén, Preisler and Heiling, 1979; Preisler, 1979).

There was just about no movement, bodily or facial expression, that did not turn out to be meaningful upon careful analysis. It was not always easy to understand the precise meaning or purpose of certain elements of behavior. But by going back and forth in the video recordings - both in a single recording and between

several recordings with time lapses between them, in most cases it was possible to find answers to why a child acted or reacted in a certain way at the particular moment in time.

Initially, some of the children's body movements were not transcibed. In a couple of interactions, however, we observed that the children moved the whole or some part of their body in a somewhat twisting manner. At first, we could not ascribe any meaning to this behavior. It was not until several videorecorded interactions had been observed and analyzed in greater detail that the meaning of these body movements became apparent.

These movements were then found to give the information that the play "was only for fun", and to have the function in several interactions of avoiding conflicts.

These twisting movements have not been described in other studies of child-child interactions. It has been observed that such movements are made by hearing children and can be given a similar interpretation (Blohm, under preparation).

One insight of the present study is that the analysis of the behavior of "normal" children can benefit from the study of "different" children. It turned out that several elements of behavior displayed by the hearing children studied by Blohm, were not found to have any communicative purpose until comparisons had been made with the behavior of deaf children in similar situations. Observations of the deaf children's play, when they were using signs, pantomimes, and gestures compared with observations of hearing children in similar situations revealed, for example, that the hearing children used pantomimes and body gestures in very much the same way as the deaf children. This had not been noticed at first. In fact, many of the similarities between the way the deaf and the hearing children acted and reacted were not noticed until the sound track of the video recorder had been turned off.

In several situations detailed analyses of the video recordings revealed an entirely different picture from that obtained in direct observation. For example, sometimes in direct observation interactions between deaf children with late sign language experience were perceived as interactions with a dense pattern of communicative behavior. Detailed analyses of what the children did and the consequences of their behavior for other children's behavior revealed a different picture. What at first appeared to be a dense pattern of communication was instead seen to be non-responded contact initiatives, short dialogues with only one turn etc. One example is the interaction named "The planning of a play - and the result", described in section VIII.3.3. Analyses of the video recordings revealed that what at first was considered to be smooth interaction, was rather a situation characterized by the inability to reach a mutual decision, with interrupted conversation and nonresponded contact initiatives.

The analysis of contact initiatives in this study - that is how a child initiates contact with a partner and the consequences of the initiation - has given valuable information about communicative abilitites, or the lack of these among deaf children. In observational studies of children in groups of other children it is common to register contact initiatives. Children making many contact initiatives get a higher score on sociability scales than children making fewer contact initiatives. In the present study, since the interactions were videorecorded, it was possible not only to register the number of contact initiatives, but also to determine the means used in initiating contacts and the consequenses of the initiatives. Calculations of the frequency of contact initiatives showed that both children with early and later sign language experience made many contact initiatives. When the initiatives were more closely analyzed, it was found that the orally trained deaf children with late sign language experience frequently used vocalizations and speech to gain the attention of a partner. These contact initiatives were not responded to by the partners as they could not hear them.

These nonresponded contact initiatives were in fact indications of breakdowns in communication. If only frequencies of occurrence are counted in interactions, without considering the consequences of the behavior, the information obtained can be misleading or even give a false picture of a child' social and communicative abilities.

Misjudgement of a child's status in a group can be made in direct observation as it is impossible to register all the actions and reactions involved. A child that is observed to be active, making many contact initiatives with other children and making many comments about play, can be judged to be the leader of the group if the other children's reactions to the child's behavior are not carefully analyzed.

One of the children in the above mentioned interaction "The planning of a play - and the result", was a very dominant girl. At first she was thought to be the leader of the group of four children. But detailed registration of the other children's responses to how this girl acted showed that the girl, though dominant, was not the leader. Despite her efforts to get the other children to follow her instructions, they did not. The child who turned out the be in control was instead a girl who with very limited expressions, e.g. by changing the direction of her gaze, could interrupt communication and get the other children to follow her.

A conclusion that can be drawn from the work with identifying and transcribing behavior units is, thus, that it is a valuable method for developing observational skills of the observer.

Having identified the behavior units to be transcribed from video-recorded interactions, the next methodological issue in the study was to determine how to analyze the flow of interaction between the children. The identification of single behavior units and the calculation of frequencies of occurrence of single behavior units, can be valuable in describing the situation for

an individual child in social interactions. But frequencies of occurrence, with calculations of means and standard deviations, do not have the power to describe children's actions and reactions in relation to other children's actions and reactions.

For one interaction, behavior units derived from the observation of two deaf children with early sign language experience were analyzed by calculating the probabilities of occurrence of one behavior unit happening in close connection with other behavior units. This gave clusters of behavior with high probabilities of happening together. However, these calculations of probabilities could not shed light on the flow of interaction between these two young children - how they moved in synchrony, how they waited for their turn, etc. Thus, single reliance on the probability approach obscures some of the important behavioral dynamics of interactions.

In this study, the flow of interaction between two children at a time has been described in different phases of interaction. The phases were defined by sets of behavior units, never by single behavioral actions. By analyzing the interactions in phases, it was possible to structure the data and describe it in flow diagrams (see section VII.4.2). But the phases give only an overall description of an interaction.

The dialogues for example, have to be analyzed separately to get more detailed information about their structure and content.

The third and last methodological problem in this study was that of how to recreate the transcriptions and analyses of the interactions for the reader. Of course, it has not been possible to describe the interactions in a way that does justice to their full character. To accomplish this task, each interaction would have needed it's own short-story.

An explanation of the results

In earlier studies of deaf children's social and communicative abilities, the deaf as a group have been depicted as aggressive, self-centered and linguistically retarded. The results of the present study do not confirm these results.

The descriptions of communictive strategies used by the deaf children indicate that there were differences between deaf children with early sign language experience (ESL) and deaf children with late sign language experience (LSL).

From the detailed analyses of the ESL children a picture was obtained of the deaf child as being competent in the art of communication; knowing the complex rules of social interaction and communication. However, analyses of the communicative strategies used by the orally trained deaf children with late sign language experience give a picture that somewhat contrasts with that of the ESL children. This picture is similar to the one we had from earlier studies of the development of orally trained deaf children.

From microanalytic studies of early patterns of mother-infant interactions, it has been recognized that communication is composed of a subtle system of actions and reactions. We are also aware that the ability to communicate - to become familiar with and learn to use complex rules in interpersonal interactions - is obtained very early in life. The infant has an active role in these early interactions and has been found to have an amazing ability to elicit contact initiatives from the caregiver, by gazing and smiling and by using body movements, gestures and vocalizations. This early exchange of meanings, that later becomes a dialogue, is supported by the caregiver and is characterized by turn-taking patterns, where each participant takes his/her turn.

Given normal conditions of growing up, turn-taking, rhythm-sharing, the use of gestures, facial expressions, visual and vocal behavior become more sophisticated in communication as the child grows older. When the child has reached the age of about one year, there is already a well developed pattern of communicative behavior used in social interactions. At this age, the first utterances of the hearing child are usually registered. This is not the case for the deaf child.

In the early parental guidance given to parents of deaf children it has been customary, to recommend an oral/aural approach. It was considered advisable to introduce signs at a later stage - by implication when oral/aural training had failed. This advice has been given to all the parents of the children participating in the present study. However, most of the parents of the younger children, born between 1974 and 1977, did not follow this advice, but started to use signs in communication with their deaf children shortly after diagnosis of the hearing impairment.

At this point in time, the mid 70s, sign language had been more accepted in the Swedish society. Around 1973, signs were used with deaf children in many kindergartens and special schools for the deaf. Tv programs about and with deaf adults and deaf children were produced and broadcast, as well as tv sign language courses for hearing persons. In other words, sign language became generally recognized as a language and not a primitive system of gesticulation.

The parents of the five deaf children with early sign language experience in this study, had accepted their children as children who could not hear and therefore needed gestural-visual means of communication. As table 3, page 97 shows, the ESL children had the most severe hearing impairments. These children had not been subjected to oral/aural training, neither by their parents nor by their preschool teachers. They had all had access to a spontaneous language development.

The children with early sign language experience had all been brought up in an environment where communication had been easily accessable. The children were encouraged to take part. They were used to understanding what their parents told them and used to being understood by their parents. Communication was for these children a mutual process, where two or several persons take part and where the partner's possibilities and points of view are important and must be taken into account, in order to reach mutual understanding. During infancy and early childhood, these children had learnt the rules of communication in social interaction. This knowledge was now reflected in the way these children interacted with other deaf children.

Of the five children with early sign language experience, four were girls. Studies of language development show that girls generally start to talk at an earlier age than boys and that girls perform better verbally than boys up to around adolescence.

In the description of the child-child interactions, the children with early sign language experience to a greater extent than the LSL children, used verbal means - signs - in communication, accompanied by a sophisticated pattern of nonverbal behavior.

Of the ten children with late sign language experience, five were boys and five were girls. In the descriptions of the interactions with the LSL children, several consisted of interactions between girls. (See interactions 5, 10 and 16.)

A comparison of communicative strategies used by the ESL girls and the LSL girls in interactions with other ESL and LSL girls respectively, shows that different strategies in communication were used. The LSL girls relied mostly on various forms of nonverbal behavior, mainly as substitutes for verbal means of communication. The LSL girls were older than the ESL girls and

could therefore be expected to use verbal means of communication to a greater extent than the younger ESL girls. The differences in communicative strategies used by the ESL and the LSL children could hardly be attributed to sex differences.

During the years to come, it will become more common to recommend that parents start using signs in communication with their deaf child. Thus there will be more opportunities to study extensively the communicative strategies for both boys and girls with early sign language experience*.

Some of the ten children with late sign language experience had a severe hearing impairment while others were profoundly deaf. (See table 3, page 97.) The children were born between 1970 and 1975. Several of the children were a couple of years older than the deaf children with early sign language experience. The earliest point at which signs had been introduced was when these children entered kindergarten at the age of between three and four years.

Seven of the ten children with late sign language experience had been trained to use vocalizations and speech sounds in communication. Hearing adults not only responded to these means of

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*) In a longitudinal study (Hulphers, in press) of the cognitive and communicative strategies of deaf children with early sign language experience, a young boy has been observed via video recordings and direct observation at regular time intervals. The first observation of this boy was made when he was twelve months old. Detailed registration and analysis of this boy's actions and reactions in various social settings showed that he used several signs in communication at the age of twelve and thirteen months. He also used nonverbal behavior in a variety of ways, for example to modify a message or enhance the meaning of his utterance.

communication from the children, they also encouraged them. These children did not have to wait and watch their partner and see if they were paying attention or ready to start a conversation. In most instances they got a response from the adults anyhow.

Most of the orally trained deaf children did not use speech sounds that were intelligible or understandable for persons who did not know the children well. They also had obvious difficulties in understanding what other people in the social environment were telling them. Furthermore, the analysis of the communicative strategies used by the LSL children in interaction with other deaf children revealed that these children lacked knowledge of many rules of communication in social interactions.

Children's hearing impairments are generally detected rather late in the prelinguistic period, unless there is a special reason to suppose a problem may be present. Routine screening tests at the age of eight to ten months of age are part of the procedure at many baby clinics in Sweden. Before a definite diagnosis is made, the child has usually reached an age of around one year.

This comparatively late ascertainment of hearing impairments implies that the congenitally or prelingually deaf child interacts with the hearing environment in much the same way as the hearing child. The deaf child is also a child who is active in communication with the caregiver. Gradually a sharing of understanding is reached between infant and caregiver.

What happens then when an oral/aural training program is introduced? To answer this question a, long overdued, definition of what is language training is needed. Language training can be defined as:

> "...any dyadic interaction where one partner is intent on making something that does not form part of a natural and spontaneous communciation. Particularly when an adult is intent on correcting in order to make a child perform in accordance of some standard instead of communicating for the sake of mutual understanding" (Nordén, personal communication).

Concentrating on speech and auditory training, the caregivers will be likely to change their manner of communicating, paying special attention to speech - at the cost of other communicative signals. Also they are likely to alter their way of talkling. They will articulate words carefully and with elaborated lip movements in order to enable the child to lipread. A look in the mirror is enough to tell us that if we are talking to somebody in this manner our faces are distorted. Apart from the fact that our lips move in an unusual way, with the tongue showing, our eyes become wide, we stare and our body movements become stiff. The synchrony of body movements in relation to our speech is thus disrupted.

The change in the parent's behavior will also affect the child's behavior. Established rules of communication in social interaction will be disrupted. There is a risk that instead of learning new abilities, the child is gradually deprived of much of the knowledge of the rules of interpersonal communication. The way the deaf children with late sign language experience and subjected to oral/aural training behaved in interaction with other deaf children made one question whether these children had ever experienced beeing "in communication" with others.

The studies of the language development of orally trained deaf children referred to in section III.4.1 showed that the parents' experience of oral/aural training the child might itself influence the parents' attitudes and feelings towards the child. Disturbances in the interaction between deaf children and the caregiver caused by the tiresome experience of speech training has been reported by, among others, Goss (1970), Schlesinger and Meadow (1972), Manfredi and Fruggeri (1978) and Greenberg (1980).

If an oral/aural training method is emphasized, the deaf child is deprived of a natural means of communication. Communication between the deaf child and the parent will be characterized by disturbances and breakdowns which in turn will have consequences not only for the parents' attitudes and feelings but also on the child's emotional, social and cognitive development.

Studies of "normal" child-caregiver interactions indicate that what the mothers are doing most of time is simply trying to communicate with their children. If language training is introduced - a spoken as well as a signed language - the caregivers will no longer be engaged in natural communication settings. The caregiver will instead be engaged in teaching. McNeill (1966) reports how he found that adult grammar was used in teaching deaf children and in turn was expected of them. Since hearing children do not learn a few words, then start stringing them together as adult utterances, McNeill questioned why this was expected by deaf children. The explanation is probably that there has been a lack of knowledge, based on systematic and detailed studies, of language acquisition processes.

In Sweden today most parents and teachers use sign language communication with the deaf children. But how a child - deaf or hearing - acquires language is still insuffiently known. It was not many years ago that I showed a video recording for students at a teacher's training college. The students were training to become special teachers for the deaf. On the videotape, a one year old deaf child was signing to her parents. One of the students made the remark that the girl did not sign correctly: she placed the sign on the wrong part of the body in one instance, and she used only one finger instead of two, in another. In the discussion that followed I realized that these students in fact knew very little about infant development and language acquisition processes. These students were not aware of that deaf children use "baby signs" in exactly the same way as hearing children use "baby speech". Again, the deaf child was expected to perform at a much more advanced level than the hearing child.

What are the consequences for the child if diagnosis of a hearing impairment is made late and the child is reared as a hearing child? Of the ten children with late sign language experience, three had not been subjected to oral/aural training. One of these three children had become deaf when he was two and a half years old, the second child had only a moderate hearing disorder. As

she did not respond to speech and auditory stimulation to the extent that could be expected, signs were introduced. For the third child with late sign language experience, a hearing impairment had been assessed when he was four years old. The child - a boy named Billy here - did not speak at this time. However, according to his parents he was a child who could participate in communication. His parents were expressive in their way of communicating. They used a variety of gestures and other expressive movements in communication. There was a well - developed mutual understanding between the parents and the boy, which probably is the reason for the late discovery. The parents treated him as a child who could understand, that is as a competent child. Sign language was introduced for this boy when deafness was assessed. He very quickly learnt to communicate with signs and his language development proceeded rapidly.

Observation of Billy and Lisa*, also reported in this study, as well as observations of other deaf children with late sign language experience but not orally trained (Nordén, Preisler and Heiling, 1979; Ahlgren, personal communication) show that these children have command of the rules of communication in social interactions. These children have not been trained to use vocal means of communication inadequate for a child who cannot hear. When a gestural - visual code has been introduced to these children, they very quickly learn to communicate with signs.

In order to provide the child with a "normal" environment for growing up, including opportunities for a harmonious personality development, certain conditions that fulfill the basic needs that all children have must be satisfied. Among these are affording

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*) Lisa's hearing impairment was assessed when she was two years old. Sign language was introduced shortly afterwards. She has been described in the group of children with early sign language experience despite the comparatively late introduction of sign language.

the child the opportunity to have meaningful communication with the social environment. Social interaction must be founded on communication symbols that are easily attainable for the child. If he is to learn the rules of social interaction, the child must have been engaged in meaningful social interactions. He must also have the opportunity to explore - through actions and by questioning - in order to construct meaningful relations. In interaction with the social environment the child must be given the chance to develop an identity as a competent person.

The analyses of the present study indicate that one important condition for providing deaf children with the opportunity to a "normal" language development and a "normal" social development is not to deprive them of the experience of spontaneous communication. This means that deaf children should be allowed to develop their communicative skills in the absence of the disturbances that are introduced when they are subjected to oral/aural training.

Linguistic models?

The parents of the ESL children had no prior knowledge of sign language when their children's deafness was diagnosed. They started to learn sign languge when the children were between one and two years old. Compared to a deaf child with signing deaf parents or a hearing child with hearing parents, these deaf children had been exposed to a limited linguistic system. In spite of this the children have become competent signers.

After examining studies of the prelinguistic communicative behavior of children and from discussions with parents who started to use signs in communication with their deaf child shortly after their child had been diagnosed as deaf and who, in addition, never used oral/aural training, I have come to believe the following:

If parents to deaf children preceed to use and expand their use of those means of communication that they have used during the

prelinguistic period of the child's life, such as visual behavior, facial expressions, pointing, and other hand gestures, body movements, speech and vocalizations, i.e. all those means of communication that all parents use with their children, the deaf child will gradually learn the rules of communication in social interaction. Sign langugage can then be added to the pace that the parents learn to sign. The important issue is not to break an already established pattern of communication, but to add to by introducing visual-gestural linguistic expressions.

The importance of peer interactions

Children need to interact with peers as well as adults, as was emphasized by Piaget (1932). The deaf children in this study went to kindergarten in small groups led by specially trained pre-school teachers. The hearing children quickly learnt to use single signs or even short sign sentences. However, their sign vocabulary was very restricted.

At one instance when we came to the kindergarten to make video recordings, many of the deaf children were not present. The only child attending preschool activities this day was Lisa. We made video recordings of her when she and several hearing children were painting. When observing Lisa directly we noticed only that she was unusually quiet. But when we analyzed the videotape we were immediately struck by the expression on her face, an expression that is difficult to describe in words. It was both empty and withdrawn. Her face conveyed an impression of great loneliness. She looked up once or twice to check what the other children were doing, but she did not initiate contact with them. In a couple of instances she commented on something to the teacher. When the hearing children wanted to ask her something or borrow something from her, they turned to the teacher who acted as an interpreter. In this situation, Lisa was not with peers. To be with peers for a signing deaf child means to be with other signing deaf children.

Suggestions for future research

In the present study different communictive strategies in child-child interactions have been identified. In order to focus attention more closely on certain aspects of these strategies, as e.g. modification of communication, synchrony in body movements in relation to a partner's body movements, imitation of partner's actions, adaptation to a partner in conflict situations, a more controlled research setting than the ones described in the present study would be needed.

Turn-taking patterns in dialogues and synchrony in body movements in conjunction with a child's production of signs and a partner's responses are other examples of research areas which could be more closely examined in a controlled setting. This would for example require two cameras facing each participant.

What will happen in the future to the fifteen children participating in the study? Will the differences in communicative strategies between the ESL and the LSL children remain or will they diminish as the children get older and mature; that is as their experience and interaction with the social environment increase?

These and related questions concerning the children participating in the study will be possible to answer, as the children are a part of a longitudinal study of the learning processes and personality development of deaf children, conducted by Kerstin Nordén at the Department of Educational and Psychological Research, Malmö School of Education.

In Sweden today, many parents of deaf children start to use sign language at an early age. Will these children use communicative strategies in social interaction similar to those used by the five ESL children in this study? Several young deaf children introduced to signs at the age of nine to twelve months of age are now being observed in different social settings by Kerstin

Nordén and her colleagues. It will be possible to compare these children's communicative strategies in social interactions with the strategies used by the five ESL children in this study.

The results of the study of social interactions between deaf preschool children indicate that auditory stimulation does not seem to be of critical importance in the development of communication. The question that follows is then: What role does vision play in this development? Which communicative strategies do blind children display in interactions with the social environment? These and related questions in the field of communication are the next challenge in my own future research.

A final comment

When I began this study, there were very few relevant, published studies concerning deaf preschool children's communicative behavior in interactions with other deaf children of a similar age. Furthermore, there was no theoretical work reported on child-child interaction focusing on nonverbal behavior. Finally, existing theories of child development only pertained to "normal" development. Thus, there was very little prior empirical and theoretical work that could serve as a guide in the collection and analyses of the data.

However, the work of Jean Piaget has come to have great influence on this study, from the planning to the interpretative stage. Piaget emphasized the importance of observing children. His own observation of children were motivated by his determination to show that the study of the nature of knowledge could be persued by observing the delelopment of children's knowledge systems.

Piaget's standpoint was that philosophical discussion alone could not answer epistemological questions. Only through close observation of actual behavior and by listening to children could answers ultimately be proposed. Piaget's standpoint was formulated in the 1920s and was considered revolutionary at that time.

Piaget also pointed out the importance of social interaction in the child's intellectual development (1947):

> "Society (Social interaction - my remark) ... changes the very structure of the individual, because it not only compels him to recognize facts, but also provides him with a ready-made system of signs, which modify his thought; it presents him with new values and it imposes on him an infinite series of obligations. It is therefore quite evident that social life affects intelligence through the three media of language (signs) the content of interaction (intellectual values) and rules imposed on thought (collective logical or pre-logical norms" (p. 156).

One important aspect of the social environment of the child is, according to Piaget, peer interactions (1932). Piaget thought that by observing the child in interaction with other children - and not only with adults - it would be possible to observe both its social and intellectual development. The analyses of deaf children in social interactions with other deaf children have revealed the competence of the deaf child with early sign language experience in the art of communication. It is my belief that it is very important to regard children who cannot hear (or who cannot see, or otherwise function in another way than the "normal" child) as competent children. Instead of regarding the deaf child as a child who <u>cannot</u> hear and who <u>cannot</u> speak the way a hearing child does, we should look upon the deaf child as a young individual who <u>can</u> use vision, who <u>can</u> use body movements. gestures, touch and other means of communication.

Gliedman and Roth (1980) write that:

> "If one thing is clear from the autobiographies of the handicapped, it is that the first hazard many face is the demoralization that can result from having one's competence as an individual constantly challenged while one is growing up - not because one actually is incompetent but because the able-bodied <u>think</u> one is" (p. 71).

In treating children as competent beings we enable them to become competent. For a deaf child to develop full potential, socially, cognitively and emotionally, a visual-gestural linguistic channel is apparently a prerequisite.

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APPENDIX 1. ANALYZED INTERACTIONS

Interaction no	Children	Age	Content of the interaction	Duration (minutes)
1 see p. 153	Lisa Susan Eric Lotta	3:05 5:07 5:05 3:08	The children are seated at a circular table, painting small clay figures, that they have modelled some days before	7.00
2 see p. 153	Lisa Susan Eric Lotta	3:05 5:07 5:05 3:08	The children are playing with a big jig-saw puzzle on the floor. (Lotta is entering the play after a little while, and seated mostly outside the angle of the camera and is not included in the analyses)	7.20
3 see p. 171	Susan Fredric	5:11 7:00	The children are playing a game called the "mouse trap"	5.00
4 see p. 160	Lisa Eric Lotta	3:09 5:09 4:00	The children are playing in a a small playroom at the kindergarten, where there are a lot of toys	7.10
5 see p. 175	Susan Lena	6:03 6:09	The girls are seated at a table, making patterns of indian pearls on a wooden frame	5.25
6 see p. 194	Eric Johnny	6:01 6:08	The boys are running around in a play room	1.50
7 see p. 196	Eric Carl	6:01 6:04	The boys are running around in a play room	1.15

Interaction no	Children	Age	Content of the interaction	Duration (minutes)
8	Eva Maria	3:00 3:10	The girls are seated at a table playing a game with a dice	1.45
9 see p. 138	Eva Lisa	3:2 4:3	The girls are seated at a table drawing on big sheets of paper	2.30
10 see p. 179	Billy Susan Lena Margaretha	5:2 6:8 7:0 6:7	The children are strolling around in one of the play-rooms planning a play	3:00
11 see p. 134	Lisa Lotta	4:06 4:09	The girls are dressing up in fancy clothes	4:30
12	Eva Lisa Lotta	3:05 4:06 4:09	The children are dancing to ABBA's music	3:20
13	Eric Johnny	6:06 7:01	The boys are seated at a table painting on papers with water colours	7.45
14	Eva Lisa Maria	3:06 4:07 4:03	The girls are running up and down on three big boxes of different sizes, placed in the middle of the room	4.20
15	Eva Lisa Maria Lotta	3:06 4:07 4:03 4:10	The girls are lying on the floor playing the game the "mouse trap"	2.30

Interaction no	Children	Age	Content of the interaction	Duration (minutes)
16	Billy	5:5	The children are seated at	4.00
see p.	Susan	6:10	a table making small	
185	Margaretha	6:09	clay figures	
17	Eva	3:08	The children are playing in one	3:05
see p.	Lisa	4:09	of the play rooms preparing	
141			a breakfast meal	
18	Eva	3:08	The play is a contination of	3.25
see p.	Lisa	4:09	observation 17, now with a	
144	Maria	4:05	third girl, Maria	
19	Billy	6:00	The children are seated at	5:30
see p.	Maria	5:00	a table making dolls from	
188			round white balls which they	
			put on top of a long stick	
20	Billy	6:00	The children are playing a	7:30
see p.	Maria	5:00	doctor's game with an adult	
191			as the patient	
21	Eva	4:04	The children are seated at a	2:40
see p.	Lisa	5:05	table discussing different	
149			matters, before starting to draw	
22	Judy	4:00	The children are playing in one	3.55
see p.	Nick	4:04	of the playroom preparing for the	
162	Karen	3:11	dolls' grandfather to arrive	
23	Judy	4:00	A continuation af interaction 22.	2.05
see p.	Nick	4:04	A discussion	
162	Karen	3:11		

Inter-action no	Children	Age	Content of the interaction	Duration (minutes)
24 see p. 166	Judy Nick Karen	5:07 5:11 5:06	The children are standing around a table, picking up small plastic pearls from a big bowl	3.05
25 see p. 166	Judy Nick Karen	5:07 5:11 5:06	The children are cleaning up after having played with the plastic pearls	2.10

15 children in 25 interactions - 7 between deaf children with early sign language experience, 9 between deaf children with late sign language experience and 9 with mixed groups participated in the study.

The total time of videorecorded interactions: 1 hour, 42 minutes, 15 seconds.

APPENDIX 2. BEHAVIOR UNITS

Visual behavior

Look at own activity - the eyes are directed towards the child's own activity or body.
Look at the partner's activity - the eyes are directed towards the partner's activity or body.
Look in the face of the partner - the eyes are directed towards the face of the partner.
Scanning - the eyes are wandering around the room.
Glance - the eyes may be flicked briefly in some direction or the head may be flicked rapidly, orienting the eyes and the face towards something or somebody, and then turned away again.
Deicitic gaze - the eyes are directed towards a certain goal and then turned away again, back to the partner. A deictic gaze can be accompanied by a pointing of the hand or finger.
Following a deictic gaze - the eyes are turned towards the direction where the partner is pointing (either with the eyes only or with the eyes and the hand/finger).
Look down - the eyes are directed at the body or at the side of the body, usually as response to the partner's eye contact or verbalizations.
Stare - a look lasting for more than a second, usually more. There are no eye movements observed in 'stare'.
Fixate - the eyes are directed to the eyes of the partner for a prolonged unblinking stare, for more than a second, usually longer.
Searching with the eyes - the eyes are wandering along objects or persons in situations where the child is obviously searching for an object or a person. The head is slightly moved forwards.
Look at the camera - the eyes are directed towards the camera.
Blink - a burst of rapid blinking.
Eyelids closed - the eyelids are closed and remain shut for about a second or longer, before opening again.

Head movement

Head to the side - the head is tilted to the left or right side.
Head nod - the head is moved up and down once or several times.
Head shake - the head is rotated from side to side once or several times.
Hang - the head is tilted forward fully, and gaze is directed almost vertically down.
Head away - the head is moved away from the partner, usually a sharp head movement away from the partner.
Chin out - the head is tilted, pushing the chin forward and stretching the throat. "Looking down one's nose".
Head forward - the head is held in a forward position.
Head movements used as gestures - the movements of the head are described in detail.

Facial expression

Simple smile - the lips are held together and drawn up and out at the corner.
Broad smile - the mouth corners are drawn up and out, the lips parting, usually revealing the teeth.
"Looks sad" - the corners of the mouth are drawn down, the lips are usually closed, the lower lip is in some cases trembling.
"Looks angry" - the lips are pressed together and turned into the mouth. The eyebrows are drawn low against the upper eyelids.
"Looks sour" - the mouth corners are drawn down, the lips closed.
"Looks inquiring" - the eyebrows are lifted, the lips are together and turned into the mouth and the mouth looks almost round.
"Looks wondering" - the eyebrows are drawn down, against the back of the nose, the lips are usually partly apart.
"Looks surprised" - the chin is downwards, the eyebrows are lifted, the eyes are wide open, the mouth is open.
"Looks frightened" - the mouth is open, the eyes are wide open.

The facial expression is often combined with a slight movement backwards with the head.
Mimicry - different gestural configurations in the face. The expressions are described in detail.
Grimace - the lips are retracted, the teeth may be visible, but clenched and the mouth may be turned down. The eyes are usually half closed. There are wrinkles around the nose and forehead.
Tongue out, at the partner - sticking out the tongue at the partner.
Showing the tongue - the tongue is protruding beyond the lips. The lips are relaxed.
Open mouth - the mouth is open, but the teeth are usually not shown. The mouth corners remain in a neutral position.
Tense mouth - tense lips, that are drawn forward. This expression can be noticed when the child is very concentrated.
Yawn - the mouth opens widely and fairly slowly, closing more swiftly.

Body movement/body posture

Bend over to - the upper part of the body is inclined forwards or to the side. The head is sometimes a bit further ahead.
Move away from the partner - the body is moved away from the partner.
Turn around - the whole body or the head and shoulders only are turned around.
Stretch out for - leaning the body forwards to reach something or somebody.
Stretch the whole body - the body is stretched, the chest outwards, the shoulders backwards.
Shrink - the chest is inwards, the shoulders forwards, downwards.
Freeze - the whole body is still, freezing in the middleof an activity.
Pantomime - this body movement can be defined as a delayed imitation. The child is imitating somebody or something. The configuration of movements is described in detail.

Bodygestures - these are direct bodymovements and expressions with the whole or most parts of the body, making up a 'gestalt'. Bodygestures are described in detail.
Trespass of the partner's personal space - this is not a behavior unit as the others in this category, but a judgement of the child's behavior at a certain point in time. This transcription is always followed by a behavoir unit, describing how the personal space is trespassed.

Locomotion

Walk
Run
Jump
Jump in affection. This jumping behavior occurs in situations where the child becomes very angry or very happy.
Fall
Climb
Stamp
Sit
Lie
Raise
Stand
Creep

Bodily contact

Touch - the partner is touched with the hand or the elbow, usually as a means of getting the partner's attention.
Touch during play - the partner is touched during activities like helping the partner to dress, or combing the partner's hair.
Touch by chance - the partner is touched by chance, without any intention to touch. There is usually no mutual gaze during this type of touch.
Pat - the flat hand is gently tapped once or several times on some part of the partner, usually on the upper part of the body.

Embrace - the arms are exteded and placed around the partner's neck or body.
Hold - the arms are stretched out towards the partner and his/her side or arms are gripped firmly.
Hit - the partner is hit once or several times with one or both hands towards the head or body. (If the partner is hitting back, it is a 'fight').
Hit in the air - the arms are extended towards the partner's body, and there is a movement as if the child intended to hit the partner. There is no bodily contact however.
Fight - this is a complex behavior, involving different movements. The child and the partner grasp each other and push and pull. During fights there are usually no smiles in the children's faces.
Push - the arm/s is/are flexing with the flat hand against the partner's body. The pushing behavior can also be performed with the side of the body.
Wrestle - the child and the partner are on the floor, half kneeing or lying. While wrestling, there is usually a smile on the face of the children.
Force one's way ahead - the body is pressed towards the partner, e.g. to get first in a queue.
Shove - the partner's arm, hand or whole body is pushed away from the child.
Bite - the partner is bit on some part of the body.
Scratch/pinch - the partner's body is scratched/pinched with one or both hands.
Kick - one foot is kicked at the partner's leg or other part of the body.

Auto manipulation/selfadaption

Manipulation of the own body - the own body or the clothes are manipulated with one or with both hands.
Manipulation of the own body with an instrument - the body or the clothes are manipulated with an instrument - i.e. a pencil. Manipulation of things with the hands in an automanipulative manner -

the child can for example be tapping the fingers repetively on the table.
Motoric activity with the feet - the feet are moved repetively.
Selfadaptions of the face - the lips or the teeth are licked by the tongue.

Arm/Hand gesture

Point - the arm and usually also one or several fingers are held in a specific direction. The gesture can refer to a person, - me, you, etc. - or to localisations - here, there etc.
Wave - the hand is moved slightly or markedly in front of the partner, usually as a means of getting the partner's attention.
Show - an object is held out with the hand/s orienting it towards the partner for him/her to see.
Give - an object is hold out for the partner to take, or an object is placed in front of the partner, for the partner to take.
Take - the child is offered something from the partner and takes it.
Take away - the child takes something from the partner.
Try to take an object - the child tries to take an object from the partner, but without succeeding.
Try to keep an object - in response to the partner's trying to take an object holding on the object.
Stretch arms to - the arms/hands are stretched towards the partner, as in invitation for example to dance.
Various gestures - gestures performed with one or both hands/arms. The gestures are described in detail.

Verbal behavior

Talk - distinguishable words are heard. The lips are formed to words and the child uses the voice.
Sign - the hands are formed to distinguishable signs.
Fingerspell - the hand forms the finger alphabeth with the left or the right hand.

Noncomprehensible talk - the lips are moved to form words, but the sound and the movements are impossible to understand as words even for a person who knows the child.
Articulation - the lips are moved to form distinguishable words, but the child is not using the voice.
Unstructured lipmovements with voice - the voice is heard and the lips are moved the movements are not readable into words. These movements have been observed e.g. when the child is imitating a telephone call. (Leach (1972) calls it the "jumble of sounds produced when a younger child is trying to talk").
Sing - musical utterance with or without words.

Other audible expressions

Vocalizations - the child uses the voice, e.g. to call attention. There is no articulation.
Other vocalizations as coughs, grunts etc.
Laugh - the mouth is usually wide open and the head/slightly/ moved or thrown back. The sound is variable.
Giggle - the mouth might be shut and there is some sound, but not as much as in "laugh".
Exclamations - e.g. Ohhh, Ahhh!
Scream - high-pitched wail, of piercing qaulity.
Weep - the eyes usually become watery and express tears. The weeping is usually accompanied by short intake and long out-letting of breath, with a moaning sound.

APPENDIX 3

Name: Lena
Age: 6:09
Group: Lena-Susan

Video recordings: 781004
Rec.no: K 79-7
Timer: 11.01 - 11.30

Sec	Visual behaviors	Head movements	Facial expressions	Body movements	Locomotion	Bodily contact	Automanipulation	Hand/arm gestures	Verbal behaviors	Other audible expressions
01	Looks at own act.				Sits			Gesture*		
02	Looks at S.									
03				Shrinks						
04	Looks at S:s act.									
05	Looks at S.									
06										
07	Looks at own act.		Mimicry*							
08										
09										
10										
11										
12										
13										
14										
15	Looks at S:s act.									
16										
17										
18										
19		Head shake								
20										
21	Looks at own act.									
22	Deictic gaze /S.									
23	Looks at own act.		Mimicry**							Signs,articul ("NOT GOOD")
24										
25	Looks at S:s act.					Touches S.				
26										
27										
28	Looks at own act.								Signs ("NO NO")	
29								Points	Signs ("RED")	
30			Mimicry*						Signs ("I KNOW")	

* Pouting lips
**Big open mouth, wrinkled nose.

*Right hand to the mouth, with elbow on the table: "What am I to do?"